Dr. Gerald S. Frankel: Curriculum Vitae, 2023

Dept. of Materials Science and Engineering
The Ohio State University
4024 Fontana Laboratory, 140 W 19th Ave.
Columbus, OH 43210

Phone: 614-688-4128
Mobile: 614-432-2377
frankel.10@osu.edu
http://www.osu.edu/fcc

Employment/Education

1995-	Director, Fontana Corrosion Center, OSU
1995-	Professor (1999-) and Associate Professor of Materials Science and Eng., OSU
2018-	Distinguished Professor of Engineering, The Ohio State University
2007-18	DNV Designated Chair in Corrosion, The Ohio State University
2012-16	Member, Nuclear Waste Technical Review Board, appointed by President Obama
2013	Visiting Professor, The Technion Israel Institute of Technology, Haifa, Israel
2012	Visiting Professor, Monash University, Melbourne, Australia
2009-11	Adjunct Professor, Pohang Institute of Science and Technology, Graduate Institute of Ferrous Technology, Pohang, Korea
2008	Invited Professor, University Pierre and Marie Curie, Paris
2004-05	Visiting Scientist, Max Planck Inst. For Iron Research, Dusseldorf, Germany
1986-95	Research Staff Member, IBM T.J. Watson Research Center, Yorktown Heights, NY
1985-86	Post-Doctoral Associate, Swiss Federal Technical Institute, Zurich, Switzerland
1985	Sc.D., Materials Science and Engineering, MIT, Cambridge, MA
1980-84	Graduate Research Assistant, MIT
1978-80	Staff Scientist, Arthur D. Little Inc., Cambridge, MA
1978	Sc.B., Materials Science and Engineering, Brown University, Providence, RI

Honors

- Olin Palladium Award from The Electrochemical Society, 2021.
- W.R. Whitney Award of NACE International, 2015.
- U.R. Evans Award of the UK Institute of Corrosion, 2011.
- H.H. Uhlig Award from the Corrosion Division of The Electrochemical Society, 2010.
- The Ohio State University Distinguished Scholar Award, 2010.
- Fellow of the following societies: NACE International, 2004; The Electrochemical Society, 2006; ASM International, 2006; Chinese Society for Corrosion and Prevention, 2021.
- Alexander von Humboldt Foundation Research Award for Senior US Scientists to support stay at Max Planck Institute in Dusseldorf, 2003.
- Lady Davis Fellowship Trust Award to support stay at The Technion, 2013.
- Grande Médaille du CEFRACOR, the French Corrosion Society, 2019.
- D.B. Robinson Lecture, University of Alberta, 2020.

- Ernest B. Yeager Electrochemistry Award of the Cleveland Section of ECS, 2012.
- Lee Hsun Lecture Award of the Institute for Metal Research, Shenyang, China, 2014.
- H.H. Uhlig Educator award of NACE International, 2000.
- Best paper awards: T.P. Hoar Prize from the UK Institute of Corrosion for best paper published in *Corrosion Science* in 2007 (Paper 95 below) and in 2013 (Paper 152 below); William Spraragen Award from the American Welding Society, 2012 (Paper 135 below); W.H. Hobart Award from the American Welding Society, 2003 (Paper 71 below).
- OSU College of Engineering awards: Clara M. and Peter L. Scott Faculty Award for Excellence in Engineering Education, 2018; Harrison Faculty Award, 2000; Lumley Research Award, 1999, 2003, 2010; Lumley Interdisciplinary Research Award, 2006; Research Accomplishment Award, 1997.
- OSU Postdoctoral Advisory Council Mentor of the Year Award, 2017.
- Fellow member of Alpha Sigma Mu, honor society for field of materials science, 2011.
- Work on Cr-free consumable for welding stainless steels chosen as 2007 Project of the Year by the Strategic Environmental Research and Development Program, SERDP.
- Chairman of 2000 Gordon Conference on Aqueous Corrosion, Invited lecturer for 1994, 1996, 1998, 2006, and 2016 Gordon Conferences on Aqueous Corrosion.
- Plenary, keynote, and award talks:
  - Olin Palladium Award address, The Electrochemical Society (virtual), 2021.
  - Keynote address, Eurocorr, Seville, 2019.
  - Keynote address, ISE Annual Meeting, Bologna, 2018.
  - Introductory Plenary Lecture, EuroCorr, Montpellier, France, 2016.
  - Introductory Lecture, Faraday Discussions meeting on Corrosion Chemistry, London, 2015.
  - Whitney Award Lecture, NACE International Corrosion2015, Dallas, 2015.
  - Introductory Plenary Lecture, 19th International Corrosion Congress, Jeju, Korea, 2014.
  - Lee Hsun Award Lecture, IMR, Shenyang, China, 2014.
  - Keynote Lecture, IMEC16, Haifa, Israel, 2014.
  - UR Evans Award Address, Electrochem 2011, Royal Society of Chemistry, Bath England, 2011.
  - Introductory Plenary Lecture at Corrosion Science Society of Korea meeting, Jeju, Korea, 2011.
  - H.H. Uhlig Award Address, ECS Fall Meeting, Las Vegas, 2010.
  - Plenary Lecture, ISE Annual meeting, Nice, France, 2010.
  - Introductory Keynote Address, Australasian Corrosion Association conference, Coffs Harbour, Australia, 2009.
  - Plenary lecture, Corrosion2009, Atlanta, 2009.
  - Plenary lecture, EUROCORR 2008, Edinburgh, 2008.
  - Plenary lecture, ASTM Symposium on Advances in Electrochemical Techniques for Corrosion Monitoring and Measurement, Norfolk, 2007.
  - Plenary Lecture, 16th International Corrosion Congress, Beijing, 2005.
  - Keynote Address, Passivity-9, Paris, 2005.
  - Introductory Plenary Lecture, International Symposium "Corrosion Science in the 21st Century", UMIST, Manchester, England, 2003.
  - Plenary address, 12th Asia-Pacific Corrosion Control Conference, Seoul, Korea, 2001.
  - Keynote address, 8th International Symposium on Passivity of Metals and Semiconductors, Jasper, Canada, 1999.

- IBM Outstanding Technical Achievement Award, 1992.
- H.H. Uhlig Student Award presented by NACE New England Chapter, 1984, International Nickel Co. Graduate Fellow, 1980-84, Elected to Tau Beta Pi and Sigma Xi.
- OSU Student Life Disability Services Special Recognition Award, 2015.
- More than 200 technical presentations, more than 340 publications.

Supervision of Research

Currently advising 4 graduate students and 1 post doc; 35 PhD and 25 MS degrees granted; 42 post-docs and visiting scholars supervised:

Ph.D. degrees granted:

1. Jian Zhang, "Development and Characterization of Corrosion Sensing Coating Systems," 1999, currently with FormFactor, Livermore, CA.
2. Donghui Lu, "The Influence of Inhibitor Ions on Localized Corrosion of Al and Al Alloys," 2000, currently with Micron Taiwan.
3. Thodla Ramgopal, "Role of Grain Boundary Precipitates and Solute Depleted Zone in the Intergranular Corrosion of Aluminum Alloy AA7150," 2001, currently with DNV, Dublin, OH. *ECS Morris Cohen award winner.*
4. Weilong Zhang, "Localized Corrosion Kinetics in High Strength AA2024 Alloys," 2001, currently with United Technologies Research Center, Hartford.
5. *Qingjiang Meng, "Effect of Cu Content on Corrosion Behavior and Chromate Conversion Coating Protection of 7xxx Series Al Alloys," 2003, currently with BP, Houston. *ECS Morris Cohen award winner.*
6. *Xiaodong Liu, "Effects of Stress on Intergranular Corrosion and Intergranular Stress Corrosion Cracking in AA2024-T3," 10/2005, currently with UOP, Des Plaines, IL.
7. Tsai-Shang Huang, "Localized Corrosion Growth Kinetics in AA7xxx Alloys," 10/2005, currently with China Steel Co., Taiwan.
8. Yeong Ho Kim, "Cr-Free Consumable for Welding Stainless Steel," 11/2005, currently with Pohang Steel Corp, Pohang, Korea.
9. *Xinyan Zhao, "Exfoliation Corrosion Kinetics in AA7xxx Alloys," 1/2006, currently with Intel, Phoenix, AZ.
10. *Jiho Kang, "Corrosion Studies of Thin Film Samples," 1/2006, currently with SK Hynix, Korea.
11. *Mariano Iannuzzi, "Mechanisms of Corrosion Inhibition of AA2024-T3 by Vanadates," 8/2006, currently at Alcoa of Australia, Perth. *ECS Morris Cohen award winner.*
12. Zhijun Zhao, "Role of Surface Active Layers on Localized Breakdown of Aluminum Alloy 7075," 10/2006, currently with Tessera, San Jose.
13. *Dong Liang, "Environmental and Alloying Effects on Corrosion of Metals and Alloys," 6/2009, currently with Alyeska Pipeline, Alaska.
14. Bastian Maier, "Electrochemical Studies under Thin Electrolyte Layers using a Kelvin Probe," 6/2010, currently with MAN, Augsburg, Germany.
15. Yang Guo, "A Study of Trivalent Chrome Process Coatings on Aluminum Alloy 2024-T3," 6/2011, currently with Novelis, Shanghai.
16. Mariano Kappes, "Evaluation of Thiosulfate as a Substitute for Hydrogen Sulfide in Sour Corrosion Fatigue Studies," 12/2011, currently at Comisión Nacional de Energía Atómica, Buenos Aires. *ECS Morris Cohen award winner.*

17. *Liu Cao, “Corrosion and Stress Corrosion Cracking of Carbon Steel in Simulated Fuel Grade Ethanol,” 8/2012, currently at DNV Columbus. *NACE Campbell Award Winner.*
18. *Huang Lin, “Atmospheric Corrosion of Ag and Cu with Ozone, UV and NaCl,” 1/2013, currently at Phillips66, Bartlesville, OK.
19. *Xiaoji Li, “Understanding Liquid-Air Interface Corrosion of Steel in Simplified Liquid Nuclear Waste Solutions,” 4/2013, currently at DNV Columbus.
20. *Brendy Rincon Troconis, “Blister Test for Measurements of Adhesion and Adhesion Degradation of Organic Polymers on AA2024-T3,” 4/2013, currently professor at Univ. Texas San Antonio.
21. *Omar Lopez-Garrity, “Corrosion Inhibition Mechanisms of Aluminum Alloy 2024-T3 by Selected Non-Chromate Inhibitors,” 6/2013, currently with Lucid Motors.
22. Severine Cambier, “Atmospheric Corrosion of Coated Steel: Relationship Between Laboratory and Field Testing,” 1/2014, currently with Arconic Technical Center.
23. Jinwook Seong, “Inhibition of Corrosion and Stress Corrosion Cracking of Sensitized AA5083,” 5/2015, currently with FormFactor, Livermore, CA.
24. Zhicao Feng, “Galvanic Corrosion of Coated Al Alloy Panels with More-Noble Fasteners,” 8/2015, currently with Kiefner & Assoc., Columbus, OH.
25. Jiheon Jun, “Localized Corrosion of Super 13Cr Stainless Steel in 1D Pit for H2S-free and Sour Brines at Elevated Temperature,” 10/2016, currently at Oak Ridge National Lab.
26. Joshua Boerstler, “Corrosion Degradation of Coated Aluminum Alloy Systems through Galvanic Interactions,” 4/2018, currently at Savannah River National Lab.
27. Aline D avila Gabbardo, “New Approaches to Study Magnesium Corrosion Behavior,” 4/2019, currently with Equinor, Rio de Janeiro, Brazil.
28. Angiere Huggins-Gonzalez, “Galvanic Interactions in Sweet and Sour Environments,” 5/2019, currently with DNV, Columbus, OH.
29. Xi Wang, “Corrosion Protection of Aluminum Alloy 2024-T3 by Al-Rich Primer,” 5/2019, currently postdoc at Ohio University.
30. Kuo-Hsiang Chang, “Corrosion in Tinplate Cans Used for Food Storage,” 8/2021, currently with Eastman Chemicals, Kingsport, TN.
31. Chao Li, “Dual pH-sensitive Smart Coatings for Corrosion Protection of AA2024-T3,” 8/2021, currently with BYD, Shanghai.
32. Anup Panindre, “Corrosion of Ni-Fe-Cr-Mo-W-X Non-Equimolar Multi-Principal Element Alloys,” 8/2021, currently with Intel, Chandler, AZ.
33. Mahdi Jokar, “Measurement and Modeling of Corrosion Degradation of Coated Aluminum Alloy 7075-T6,” 5/2022, currently with PPG, Milford, OH.
34. Sarita Sahu, “Pitting Corrosion Behavior of Multi Principal Element Alloys and Understanding Crystallographic Pit Morphologies,” 5/2022, currently with Intel, Chandler, AZ.
35. Chandi P. Mohanti, “Corrosion interactions between stainless steel and borosilicate glasses,” 7/2022, currently with First Solar, Perrysburg, OH.
36. Priyanka Adapala, “Corrosion of 6xxx Al Alloys: Compositional Effects and Galvanic Coupling with Carbon Fiber Reinforced Plastics,” 8/2023, currently postdoc at Ohio University.
37. Karthikeyan Hariharan, “Localized Corrosion of Fe and Ni-based Corrosion-Resistant Alloys: Role of Alloy Chemistry, Processing and Microstructure,” 12/2023, currently postdoc at Univ. of Erlangen.

* denotes NACE poster award winner

M.S. degrees granted, thesis option:

1. Mohammad Al-Anezi, “The Susceptibility of Conventional ASTM A516-70 to HIC and SOHIC in H_2S-Containing DGA Environments," 1998, currently with Saudi Aramco.
2. Myna Bisineer, “EIS Study of Polymer Thin Films on Thin Film Metal Substrates," 3/99, currently with Venturesity, Bangalore.
3. *Gregory Omweg, "Sulfide Stress Cracking Resistance of Welded High-Strength Low-Alloy Steels," 2001, currently with Spirometrix.
4. Younghoon Baek, "Electrochemical Quartz Crystal Microbalance Study of Corrosion of Phases in AA2024-T3," 2002, enrolled in business school.
5. Ajit Mishra, 2008, “Crevice Corrosion Repassivation of Alloy 22 in Aggressive Environments,” currently with Corteva, Midland, MI.
6. Emerson Nunez-Moran, 2010, “Evaluation of the Localized Corrosion Resistance of 21Cr Stainless Steels,” currently with Baker Hughes, Chennai.
7. Sean Xi Chen, 2010, “Corrosion Resistance Assessment of Pretreated Magnesium Alloys,” currently with Zotye Auto, Hangzhou, China.
8. Brett Tossey, 2011, “Steam Oxidation Resistance of Shot Peened Austenitic Stainless Steel Superheater Tubes,” currently with Haynes.
9. Ashwini Chandra, 2012, “On the Mechanism of Niobium Electropolishing,” currently with DNV Columbus.
10. John Guzowski, 2013, “Hot Corrosion of Advanced Nickel-Based Disc Alloys,” currently with Worthington Technologies, Columbus.
11. Sean Morton, 2013, “Atmospheric Pitting Corrosion of AA7075-T6 Under Evaporating Droplets,” currently with Ergopedia, Cambridge, MA.
12. Kerrie Holguin, 2014, “Analysis of the Degradation and Performance of a Non-Chromate Organic Coating System on AA2024-T3 Using Electrochemical and High-Resolution Microscopy Techniques,” currently with Ford Motor Co., Dearborn, MI.
13. Jermain Onye, 2014, “Atmospheric Corrosion of Zinc by NaCl, SO_2, NH_3, O_3, and UV Light,” currently with GM, Detroit, MI.
14. William Weimer, 2015, “Corrosion of Magnesium, Aluminum, and Steel Automotive Sheet Metals Joined by Steel Self-Pierce Rivets,” currently with US Coast Guard, Elizabeth City, NC.
15. Mark Thomson, 2016, “Atmospheric Pitting Corrosion Studies of AA7075-T6 Under Electrolyte Droplets,” currently with Honda, Marysville, OH.
16. Orion Swanson, 2018, “Corrosion of High-Entropy Alloys in Chloride Solutions,” currently with Shell, Baton Rouge, LA.
17. Porter Ritchie, 2020, “The Susceptibility of Electric Resistance Welded Line Pipe Steel to Selective Seam Weld Corrosion,” currently with DNV Columbus.
18. Kelsi Spicer, 2022, “Corrosion and inhibition of aluminum alloys in ammonium hydroxide for evaporators in absorption heat pumps,” currently with ESTAT Actuation, Pittsburgh.

* denotes NACE poster award winner

M.S. degrees granted, non-thesis option:

1. Junye Zhu, 1998, currently with ACS, Atlanta.
2. Uthai Tabattanon, 2000, currently with Unocal, Thailand.
3. Leonel Chiacchiarelli, 2010, currently with YPF, Argentina.

4. David Cole, 2013, currently with Eastman Chemicals, Longview, TX.
5. Seth Humphrys, 2015, currently with Medtronics, Minneapolis.
6. Yi Lu, 2018, currently at Texas A&M.
7. Brandon Lynch, 2020, currently at Diamonex, Allentown, PA.

Foreign Diploma/MS/PhD Theses directed and visiting PhD Students advised:

1. Serge Hauert, 1997, from EPFL, Switzerland.
2. Francois Buelmann, 2002, from EPFL, Switzerland.
3. Mariano Kappes, 2006, from Argentina.
4. Francois Marie, 2007, from France.
5. Severine Cambier, 2008, from France.
6. Yoshihiko Kyo, 2008, from Japan.
7. Lina Toro, 2009, from Spain.
8. Masoud Atapour, 2009, from Iran. *Winner of Iran Outstanding Student Award, 2011* and *Isfahan University of Technology Distinguished Dissertation*.
9. Junfeng Chen, 2011, from China.
10. Shan-shan Wang, 2011-13, from China.
11. Alejandro Samaniego Miracle, 2013, from Spain.
12. Dalila Sicupira, 2014, from Brazil.
13. Ju Kang, 2014, from China.
14. Luiza Esteves, 2015, from Brazil.
15. Jinyang Zhu, 2015, from China.
16. Eloa Lopes Maia, 2017-18, from Brazil.
17. Hejie Yang, 2017-18, from China.
18. Mariko Kadowaki, 2019, from Japan.
19. Massimo Calovi, 2019, from Italy.
20. Jun Wu, 2019-20, from China.
21. Raphael Franco, 2023, from Brazil

Post-docs/Research Associates/Visiting scientists supervised:

1. Zaizhu Xia, 1995-1996, currently with Lucas Aerospace, Cleveland, OH
2. Akshey Sehgal, 1996-97, currently with GlobalFoundaries, Albany, NY.
3. Eiji Akiyama, 1997-99, currently at Tohoku Univ., Japan.
4. Patrik Schmutz, 1997-2000, currently with EMPA, Zurich, Switzerland.
5. Valerie Guillaumin, 1999-2000, currently with Airbus, Toulouse, France.
6. Delphine Herbert-Guillou, 2000-01, currently with Ugine SA, Isbergues, France.
7. Liliana Lanzani, 2003, currently with Comision Nacional de Energia Atomica, Argentina.
8. Patrick Leblanc, 2000-03, took a job with Avestor, Boucherville, Canada.
9. Zhihua Sun, 2003-04, currently with Beijing Inst. of Aeronautical Materials
10. Eun Young Na, 2004, currently with Mokpo Maritime University, Korea.
11. Eiji Tada, 2004-2005, currently with Tokyo Institute of Technology, Japan.
12. Yumei Zhai, 2005-2008, deceased.
13. Shoichiro Taira, 2006-2008, currently with JFE Steel Corp, Japan.
14. Aixiang Zeng, 2007-2008, currently at Changsha University of Science and Technology, China.
15. Hideki Katayama, 2007-2008, currently with NIMS, Tsukuba, Japan.
16. Jinfeng Li, 2009-2010, currently at Central South University, Changsha, China.
17. Saikat Adhikari, 2008-2011, currently with Aditya Birla Corp., Mumbai, India.

18. Ralf Posner, 2009-2011, currently with Henkel Corp., Dusseldorf.
19. Koichi Ishikawa, 2010-2011, currently with Daido Steel, Japan.
20. Yiyun Li, 2010 – 2012, currently with TSMC, Taiwan.
21. Anawati, 2011- 2012, currently with University of Indonesia.
22. Nay Win Khun, 2011-2012, currently at Mandalay Technological University, Myanmar.
23. Santiago Fajardo, 2014 – 2016, currently with CENIM, Madrid.
24. Lining Xu, 2014 – 2015, currently at USTB, Beijing.
25. Fan Yang, 2014 – 2016, currently with A. Schulman Co., Akron, OH.
26. Shanshan Wang, 2015 – 2021, currently with Novelis, Kennesaw, GA.
27. Natalie Wint, 2016, currently at University of Swansea, Wales.
28. Yakun Zhu, 2016 – 2018, currently at USTB, Beijing.
29. Xiaolei Guo, 2016 –
30. Tianshu Li, 2016 – 2022, currently at Xi'an Jiaotong University, Xi'an, China.
31. Ching-Kuo Kuo, 2019 – 2020, currently with China Steel Corp., Taiwan.
32. Koutouan Désiré Martial Desire Abro, 2020-2021, currently at National Institute of Technology Félix Houphouët Boigny, Ivory Coast.

Personal

Date of birth: January 14, 1957, Pittsburgh, PA; married, two children.

Current Research Interests

The following subjects are being actively researched in 2023: new models for pitting corrosion, , galvanic coupling of Al and carbon fiber composite, 5xxx Al alloy corrosion galvanic food can coating degradation, effect of washing and rinsing on atmospheric corrosion.

Publications in Peer-Reviewed Journals

338. P. Adapala, T. Avey, Y. Yuan, M. L. Lim, G. Bhaskaran, S. Das, A. Luo and G. S. Frankel, "Understanding the effect of microstructure and composition on localized corrosion susceptibility of 6xxx aluminum alloys," submitted to *npj Mat. Deg.*

337. K. Hariharan, L. Feng, K. Kadirvel, V. Karunakaran, K. Kosanam, N. Sridhar1, Y. Wang, G.S. Frankel, E.J. Schindelholz, "Localized corrosion of thermally aged Cu-containing Ni-13Cr-10Fe alloys: the role of Cu enrichment induced grain boundary sensitization," submitted to *Acta Mat.*, 12/23.

336. Ke Wang, Tianshu Li, Gerald S. Frankel, Mariano Iannuzzi, "On the critical pit stability product of stainless steels as a function of pit depth," submitted to *Corros. Sci.*, 12/23.

335. K. Hariharan, X. Guo, H.L. Huang, N. Sridhar, J. Srinivasan, J. Hwang, G.S. Frankel, E.J. Schindelholz, "Inter-melt pool corrosion and repassivation of additively manufactured stainless steel," accepted for publication in *Corros. Sci.*, 11/23.

334. Tianshu Li, Szu-Chia Chien, Zhe Ren, Wolfgang Windl, Frank Ernst, and G. S. Frankel, "Response to Further Comment by Martin et al.," *Scripta Mat.,* **237** (2023) 115647.

333. K. Hariharan, S. Li, C.D. Taylor, N. Sridhar, G.S. Frankel, E.J. Schindelholz, "Beneficial effect of copper on pitting resistance of Ni-Cr-Fe alloys," *Echim. Acta*, **468** (2023) 43169.

332. D.M.K. Abro, X. Guo, P.J.M. Dable, and G.S. Frankel, "Pitting corrosion susceptibility of Ni-SiO2 electrodeposited composite coatings on carbon steel assessed through the syringe cell technique in 0.6 M NaCl," *MRS Advances*, **8** (2023) 566-569. https://doi.org/10.1557/s43580-023-00543-z

331. K. Hariharan, X. Guo, J. Srinivasan, G.S. Frankel, E.J. Schindelholz, "Role of copper on repassivation of stainless steel pits," *J. Electrochem. Soc.,* **170** (2023) 071503.

330. Xiaolei Guo, Hsien-Lien Huang, Menglin Zhu, Karthikeyan Hariharan, Szu-Chia Chien, Ngan Huynh, Jinwoo Hwang, Wolfgang Windl, Christopher D. Taylor, Eric J. Schindelholz, Gerald S. Frankel, "Giant Supersaturation of Interstitial Elements in Metals from 3D Printing," *Mat. Today*, **66** (2023) 92. https://doi.org/10.1016/j.mattod.2023.04.020

329. Peter Rodič, Ingrid Milošev, and Gerald S. Frankel, "Corrosion of synthetic intermetallic compounds and AA7075-T6 in dilute Harrison's solution and inhibition by cerium(III) salts," *J. Electrochem. Soc.*, **170** (2023) 031503.

328. Ke Wang, Tianshu Li, Mobin Salasi, Gerald Frankel, Victor Calo, Mariano Iannuzzi, "B-value definition in Galvele's pit model," *Corros. Sci*., **211** (2023) 110906.

327. Yakun Zhu, Gerald S. Frankel, Leslie G. (Bland) Miller, Jackson Pope, Jenifer (Warner) Locke, "Electrochemical characteristics of intermetallic phases in Al-Cu-Li alloys," *J. Electrochem. Soc.*, **170** (2023) 021502.

326. Angela Y. Gerard, Elizabeth J. Kautz, Daniel K. Schreiber, Junsoo Han, Stephen McDonnell, Kevin Ogle, Pin Lu, James E. Saal, Gerald S. Frankel, John R. Scully, "The Role of Chromium Content on Aqueous Passivation of Non-Equiatomic $Ni_{38}Fe_{20}Cr_xMn_{21-0.5x}Co_{21-0.5x}$ Multi-Principal Element Alloy (x = 22, 14, 10, 6 at. %) in Acidic Chloride Solution," *Acta Mat.*, **245** (2023) 118607.

325. Tianshu Li, Szu-Chia Chien, Zhe Ren, Wolfgang Windl, Frank Ernst, and G. S. Frankel, "Understanding the Efficacy of Concentrated Interstitial Carbon in Enhancing the Pitting Corrosion Resistance of Stainless Steel; response to Comment by Martin et al.," *Scripta Mat.* **224** (2023) 115084.

324. Sarita Sahu and Gerald S. Frankel, "Effect of substrate orientation and anisotropic strength on corrosion pits," *Corros. Sci.* **211** (2023) 110772.

323. Mahdi Jokar, Xiaolei Guo and G. S. Frankel, "Machine Learning Approaches to Model Galvanic Corrosion of Coated Al Alloy Systems," *Corrosion*, **78** (2022) 1176-89.

322. M. Iannuzzi and G.S. Frankel, "The carbon footprint of steel corrosion" *npj Mat. Deg.*, **6** (2022) 101.

321. Steven C. Hayden, Claire Chisholm, Shannon L. Eichmann, Rachael Grudt, Brian Hanna, Tatiana Headrick, Gerald S. Frankel, and Katherine Jungjohann, "Genesis of Nanogalvanic

Corrosion Revealed in Pearlitic Steel," *Nano Letters*, **22** (2022) 7087-7093.

320. Priyanka Adapala, Niamh Hosking, Mark Nichols and G. S. Frankel, "Use of laboratory accelerated cyclic corrosion test for predicting on-road corrosion behavior of AA6xxx coupled to carbon fiber reinforced plastics," *Corrosion*, **77** (2022) 599-611.

319. Sirui Li, Gerald S. Frankel, Christopher D. Taylor, "A semi-empirical investigation of thermodynamic relations relating the work function to electrochemical corrosion," *J. Electrochem. Soc.*, **169** (2022) 081506.

318. Chandi Mohanty, Xiaolei Guo, Huseyin Kaya, Stephane Gin, Kun Yang, Zelong Zhang, Seong H. Kim, Jie Lian, Jianwei Wang, Gerald S Frankel, "Long-term Interactive Corrosion between International Simple Glass and Stainless Steel," *npj Mat. Deg.*, **6** (2022) 50.

318. Chandi Mohanty, Xiaolei Guo, Huseyin Kaya, Stephane Gin, Kun Yang, Zelong Zhang, Seong H. Kim, Jie Lian, Jianwei Wang, Gerald S Frankel, "Long-term Interactive Corrosion between International Simple Glass and Stainless Steel," *npj Mat. Deg.*, **6** (2022) 50.

317. Xiaolei Guo, Penghui Lei, Chandi Mohanty, Tiankai Yao, Jie Lian, Gerald S. Frankel, "Enhanced Crevice Corrosion of Stainless Steel 316 by Degradation of Cr-containing Hollandite Crevice Former," *Corr. Sci.*, **205** (2022) 110462.

316. Tianshu Li and G.S. Frankel, "Repassivation Underneath Salt Film on Stainless Steel Pits," *Corros. Sci.*, **203** (2022) 110353.

315. Mahdi Jokar, Joshua T. Boerstler and G. S. Frankel, "Use of Impressed Current for Accelerated Corrosion Testing of Al Alloy Panels," accepted for publication in *Corr. Eng. Sci. Tech.*, **57** (2022) 32-43.

314. Sarita Sahu and Gerald S. Frankel, "Phase Field Modeling of Crystallographic Corrosion Pits," *J. Electrochem. Soc.*, **169** (2022) 020557.

313. Kuo-Hsiang Chang, Belinda L. Hurley, Melvin A. Pascall and Gerald S. Frankel, "Corrosion in Tinplate Cans Used for Food Storage. Part 3: Effects of Cysteine, NaCl, and Tomatoes on Corrosion of Tin, Iron and Tinplate," *Corrosion,* **78** (2022) 127.

312. Mahdi Jokar and G.S. Frankel, "Galvanostatic testing of coated aluminum alloy 7075-T6 galvanic assemblies: effects of coating systems and environmental factors," *Mat. Corr.*, **73** (2022) 1015-1033.

311. A.M. Panindre, H.O. Colijn, G.B Viswanathan, X. Guo, C.D. Taylor and G.S. Frankel, "Corrosion of a non-equimolar multi-principal element alloy containing 13 at.% Ru after aging," *Corros. Sci.,* **198** (2022) 110105.

310. Angeire Huggins, Gerald Frankel, Jose Vera, William Durnie and Richard Woollam,

"Galvanic Interactions between Fe Electrodes in CO_2 Saturated Solutions with Different pH," *Corrosion*, **77** (2021) 1203.

309. Tianshu Li, Szu-Chia Chien, Zhe Ren, Wolfgang Windl, Frank Ernst, and G. S. Frankel, "Understanding the Efficacy of Concentrated Interstitial Carbon in Enhancing the Pitting Corrosion Resistance of Stainless Steel," *Acta Mat.* **221** (2021) 117433.

308. Tianshu Li, Jun Wu, Xiaolei Guo, Anup M. Panindre, and Gerald S. Frankel, "Activation Energy of Metal Dissolution in Local Pit Environments," *Corros. Sci.*, **193** (2021) 109901.

307. Chao Li, Xiaolei Guo, and G.S. Frankel, "Smart Coating with Dual-pH Sensitive, Inhibitor-loaded Nanofibers for Corrosion Protection," *npj Mat. Deg.*, **5** (2021) 54.

306. A.M. Panindre, H.O. Colijn, C.D. Taylor, G.S. Frankel, "Microstructure and corrosion of non-equimolar multi-principal element alloys hardened by metastable precipitates," *J. Alloys Comp.,* **894** (2021) 162463.

305. A.M. Panindre and G.S. Frankel, "Technical Note: Electrochemical Testing Above Ambient Temperatures Using the Syringe Cell," *Corrosion*, **77** (2021) 1025-1028.

304. Chao Li, Xiaolei Guo, and G.S. Frankel, "Corrosion Inhibition of AA2024-T3 by a Coating Containing Dual-pH Sensitive, Corrosion Inhibitor Loaded Microspheres," *Corros. Sci*., **192** (2021) 109835.

303. Shan-Shan Wang, D. Huber, J.D. Poplawsky, and G.S. Frankel, "Influence of Artificial Aging on Corrosion of Abraded Al-Zn-Mg-Cu Alloys," *Corros. Sci.*, **191** (2021) 109745.

302. Kuo-Hsiang Chang, Belinda L. Hurley, Melvin A. Pascall, Gerald S. Frankel, "Corrosion in Tinplate Cans Used for Food Storage Part 2: Characterization and Corrosion Phenomena in BPA-NI Coated Cans," *Corrosion*, **77** (2021) 700-711.

301. Shan-Shan Wang, D. Huber, J.D. Poplawsky, H. Colijn, and G.S. Frankel, "The Subsurface Structure of Abraded Al-Zn-Mg-Cu Alloy," *Materialia*, **16** (2021) 101065.

300. G.S. Frankel, J.D. Vienna, J. Lian, X. Guo, S. Gin, S.H. Kim, J. Du, J.V. Ryan, J. Wang, W. Windl, C.D. Taylor, and J.R. Scully, "Recent Advances in Corrosion Science Applicable to Disposal of High-Level Nuclear Waste," *Chem. Rev.*, **121** (2021) 12327−12383. https://doi.org/10.1021/acs.chemrev.0c00990

299. Junsoo Han, Xuejie Li, Angela Y. Gerard, Pin Lu, James E. Saal, Gerald S. Frankel, Kevin Ogle, and John R. Scully, "Potential dependent Mn oxidation and its role in during passivation of Ni38Fe20Cr22Mn10Co10 multi-principal element alloy using multi-element resolved atomic emission spectroelectrochemistry," *J. Electrochem. Soc.*, **168** (2021) 051508.

298. Kuo-Hsiang Chang, Belinda L. Hurley, Melvin A. Pascall, Gerald S. Frankel, "Corrosion in Tinplate Cans Used for Food Storage, Part 1: EIS Results of BPA-NI Coating *Corrosion,*

77 (2021) 386-401.

297. A.M. Panindre, C.D. Taylor, and G.S. Frankel, "Corrosion of Ni-Fe-Cr-Mo-W-X multi-principal element alloys," *J. Electrochem. Soc.*, **168** (2021) 031513.

296. Desheng Sun, Gerald S. Frankel, William A. Brantley, Reza H. Heshmati, and William M. Johnston, "Electrochemical impedance spectroscopy study of corrosion characteristics of palladium–silver dental alloys," *J. Biomed. Mat. Res. B,* **109** (2021) 1777-1786.

295. Clara Nyby, Xiaolei Guo, James E. Saal, Szu-Chia Chien, Angela Gerard, Huibin Ke, Tianshu Li, Pin Lu, Christian Oberdorfer, Sarita Sahu, Chris Taylor, Wolfgang Windl, John R. Scully, and Gerald S. Frankel, "Electrochemical Metrics for Corrosion Resistant Alloys," *Scientific Data*, **8** (2021) 58.

294. Tianshu Li, Jun Wu, and Gerald S. Frankel "Localized Corrosion: Passive Film Breakdown *vs*. Pit Growth Stability Part VI: Pit Dissolution Kinetics of Different Alloys: a Model for Pitting and Repassivation Potentials," *Corros. Sci.*, **182** (2021) 109277.

293. Yachun Wang, Weiguang Zhu, Tiankai Yao, Xiaolei Guo, Gerald Frankel, and Jie Lian, "Artificial passivation of nano-scale TiO_2 coating by atomic layer deposition improves water stability of Cs_2SnCl_6," *MRS Comm*., (2020) doi:10.1557/mrc.2020.84.

292. Xiaolei Guo, Stephane Gin, and Gerald S. Frankel, "Corrosion Interactions between Different Materials Relevant to Disposal of High-Level Nuclear Waste," *npj Mat. Deg*., **4** (2020) 34.

291. Huibin Ke, Gerald S. Frankel, Christopher D. Taylor, "Application of the Chloride Susceptibility Index to study the effects of Ni, Cr, Mn and Mo on the repassivation of stainless steels, *J. Electrochem. Soc.*, **167** (2020) 131510.

290. Xi Wang, Fan Yang, Gopal Viswanathan, Shan-Shan Wang, and G.S. Frankel, "Characterization and Electrochemical Assessment of Al-Zn-In alloy with Trivalent Chromium Process Coating," *Corros. Sci*., **176** (2020) 108933.

289. John R. Scully, Samuel B. Inman, Angela Y. Gerard, C. Taylor, Wolfgang Windl, Daniel K. Schreiber, Pin Lu, James E. Saal, and Gerald S. Frankel, "Controlling the Corrosion Resistance of Multi-Principal Element Alloys," *Script Mat.*, **188** (2020) 96-101.

288. Angela Y. Gerard, Junsoo Han, Stephen J. McDonnell, Kevin Ogle, Elizabeth J. Kautz, Daniel K. Schreiber, Pin Lu, James E. Saal, Gerald S. Frankel, John R. Scully, "Aqueous Passivation of Multi-Principal Element Alloy $Ni_{38}Fe_{20}Cr_{22}Mn_{10}Co_{10}$: Unexpected High Cr Enrichment within the Passive Film," *Acta Mat.*, **198** (2020) 121-133.

287. Huibin Ke, Tianshu Li, Pin Lu, Gerald S. Frankel, Christopher D. Taylor, "First-Principles Modeling of the Repassivation of Corrosion Resistant Alloys: Part II. Surface Adsorption Isotherms for Alloys and the Chloride Susceptibility Index," *J. Electrochem. Soc.*, **167** (2020) 111501.

286. Sarita Sahu, Tianshu Li, Angela Y. Gerard, John R. Scully, Gerald S. Frankel, "Localized Corrosion Behavior of Non-Equiatomic NiFeCrMnCo High Entropy Alloys," *Electrochim. Acta*, 354 (2020) 136749.

285. Xiaolei Guo, Stephane Gin, Penghui Lei, Tiankai Yao, Hongshen Liu, Daniel K. Schreiber, Dien Ngo, Gopal Viswanathan, Tianshu Li, Seong H. Kim, John D. Vienna, Joseph V. Ryan, Jincheng Du, Jie Lian, Gerald S. Frankel, "Response to: How much does corrosion of nuclear waste matrices matter," *Nature Mat.* (2020) doi: 10.1038/s41563-020-0742-4.

284. Tianshu Li, D. E. Perea, D. K. Schreiber, Mark G. Wirth, Graham J. Orren, and G. S. Frankel, "Structural Characterization and Growth Model of Salt Film on Metal," *Corros. Sci.*, **174** (2020) 108812.

283. Massimo Calovi, Stefano Rossi, Flavio Deflorian, Sandra Dirè, Riccardo Ceccato, Xiaolei Guo, Gerald S. Frankel, "Effects of Graphene-Based Fillers on Cathodic Delamination and Abrasion Resistance of Cataphoretic Organic Coatings," *Coatings*, **10** (2020) 602.

282. Jiheon Jun, Tianshu Li, N. Sridhar, G.S. Frankel, "Corrosion and Repassivation of Super 13Cr Stainless Steel in Artificial 1D Pit Electrodes at Elevated Temperature," *Corros. Sci*., **173** (2020) 108754.

281. Tiankai Yao, Xiaolei Guo, Penghui Lei, Yachun Wang, Gerald S. Frankel, Jie Lian, "Corrosion Interactions between Stainless Steel and Lead Vanado-Iodoapatite Nuclear Waste Form - Part II. Release of Iodine from Lead Vanado-Iodoapatite," *npj Mat. Deg*., **4** (2020) 15.

280. Xiaolei Guo, Yachun Wang, Tiankai Yao, Chandi Mohanty, Jie Lian, Gerald S. Frankel, "Corrosion Interactions between Stainless Steel and Lead Vanado-Iodoapatite Nuclear Waste Form Part I," *npj Mat. Deg*., **4** (2020) 13.

279. A.Y. Gerard, K. Lutton Cwalina, A. Lucente, G.S. Frankel, and J.R. Scully, "Progress in Understanding the Origins of Excellent Corrosion Resistance In Metallic Alloys: From Binary Polycrystalline Alloys to Metallic Glasses and High Entropy Alloys," *Corrosion*, **76** (2020) 485-499.

278. Xiaolei Guo, Stephane Gin, Hongshen Liu, Dien Ngo, Gopal Viswanathan, Jiawei Luo, Seong H. Kim, Chandi Mohanty, John D. Vienna, Joseph V. Ryan, Gerald S. Frankel, "Near-Field Corrosion Interactions between Glass and Corrosion Resistant Alloys," *npj Mat. Deg*., **4** (2020) 10.

277. Yachun Wang, Tiankai Yao, Fayuan Xi, Penghui Lei, Xiaolei Guo, Lingfeng He, Gerald S. Frankel, and Jie Lian, "Degradation Mechanism of Lead-Vanado-iodoapatite in NaCl Solution," *Corr. Sci.,* **172** (2020) 1098720.

276. Xi Wang and G. S. Frankel, "Transmission Line Modeling of Al-Rich Primer on AA2024-T3," *J. Electrochem. Soc*., **167** (2020) 081508.

275. Mariko Kadowaki, Arkapol Saengdeejing, Izumi Muto, Ying Chen, Gerald S. Frankel, Takashi Doi, Kaori Kawano, Yu Sugawara, Nobuyoshi Hara, "Roles of Interstitial Nitrogen, Carbon, and Boron in Steel Corrosion: Generation of Oxyanions and Stabilization of Electronic Structure," *J. Electrochem. Soc*., **167** (2020) 081503.

274. Chao Li, Xiaolei Guo, G.S. Frankel, "Corrosion Inhibition of AA2024-T3 by Smart Polyelectrolyte Coacervates Responsive to both Acidic and Alkaline Environments," *Prog. Org. Coat*., **146** (2020) 105719.

273. Shan-Shan Wang and G.S. Frankel, "Fundamental Study of Corrosion Preventive Compounds; Part III - Soft Films," *Corr. Eng. Sci. Tech.,* (2020) DOI:10.1080/1478422X.2020.1745356.

272. Joshua T. Boerstler, Mahdi Jokar and G.S. Frankel, "Corrosion of Coated Aluminum Alloy 7075-T6 Galvanic Test Assemblies, Part II: Impact of Fastener Through-Hole Condition," *Corr. Eng. Sci. Tech.*, **55** (2020) 411-424.

271. Joshua T. Boerstler, Mahdi Jokar and G.S. Frankel, "Corrosion of Coated Aluminum Alloy 7075-T6 Galvanic Test Assemblies, Part I: Unscribed Panels," *Corr. Eng. Sci. Tech.,* **55** (2020) 268-280.

270. Y. Zhu, J. Poplawsky, S. Li, R. Unocic, L. G. (Bland) Miller, C. D. Taylor J. S. (Warner) Locke, E. A. Marquis, G. S. Frankel, "Localized Corrosion at nm-Scale Hardening Precipitates in Al-Cu-Li alloys," *Acta Mat.*, **189** (2020) 204-213.

269. Xuejie Li, Junsoo Han, Pin Lu, James E. Saal, G. Olsen, Gerald S. Frankel, John R. Scully, Kevin M. Ogle, "Dissolution and passivation of a novel Ni-Cr-Fe-Ru-Mo-W high entropy alloy by elementally resolved electrochemistry," *J. Electrochem. Soc.,* **167** (2020) 061505.

268. Xi Wang and G.S. Frankel, "Protection Mechanism of Al-Rich Epoxy Primer on AA2024-T3," *Corrosion*, **76** (2020) 103-113.

267. Denis Strachan, Jarrod V. Crum, Chase C. Bovaird, Charles Windisch, Mac Zumhoff, Brian McIntosh, Xiaolei Guo, Gerald S. Frankel, "Epsilon Metal: A Waste Form for Noble Metals from Used Nuclear Fuel," *J. Nucl. Mat*., **532** (2020) 152040.

266. C. Ubeda, G. Garces, P. Adeva, G.S. Frankel and S. Fajardo, "The role of the beta-$Mg_{17}Al_{12}$ phase on the anomalous hydrogen evolution and anodic dissolution of AZ magnesium alloys," *Corros. Sci*., **165** (2020) 108384.

265. Aline D avila Gabbardo and G.S. Frankel, "Hydrogen Evolution on Bare Mg Surfaces using the Scratched Electrode Technique," *Corros. Sci*., **164** (2020) 108321.

264. Xiaolei Guo, Stephane Gin, Penghui Lei, Tiankai Yao, Hongshen Liu, Daniel K. Schreiber, Dien Ngo, Gopal Viswanathan, Tianshu Li, Seong H. Kim, John D. Vienna, Joseph V. Ryan, Jincheng Du, Jie Lian, Gerald S. Frankel, "Self-accelerated Corrosion of Nuclear

Waste Forms at Material Interfaces," *Nature Mat.*, **19** (2020) 310-316.

263. Jermain Onye and G. S. Frankel, "Effects of NaCl, SO_2, NH_3, O_3, and UV Light on Atmospheric Corrosion of Zn," *Mat. Corr.*, **71** (2020) 9-20.

262. H. Yang, Y. Gao, G.S. Frankel, W. Qin, T. Li, Z. Huang, L. Wu, "Robust superhydrophobic surface with reinforced skeletons for corrosion protection," *Appl. Surf. Sci.*, **499** (2020) 143916.

261. Yakun Zhu, Kai Sun, Jacob Garves, Jenifer Locke, John Allison, G. S. Frankel, "Micro- and Nano-Scale Intermetallic Phases in AA2070-T8 and Their Corrosion Behavior," *Electrochim. Acta*, **319** (2019) 634-648.

260. Pin Lu, Gregory B. Olson, Tianshu Li, Sarita Sahu, Orion Swanson, G. S. Frankel, Angela Y. Gerard, John R. Scully, "Computational Design and Initial Corrosion Assessment of a Series of Non-Equimolar High Entropy Alloys," *Scripta Mat.*, **172** (2019) 12-16.

259. Timothy D. Weirich, Jayendran Srinivasan, Jason M. Taylor, Michael A. Melia, Philip J. Noell, Charles R. Bryan, Gerald S. Frankel, Jenifer S. Locke, and Eric J. Schindelholz, "Humidity Effects on Corrosion Morphology of Ground Stainless Steel Exposed to Sea Salt Particles," *J. Electrochem. Soc.*, **166** (2019) C3477-C3487.

258. J. A. Yuwono, C.D. Taylor, G. S. Frankel, N. Birbilis and S. Fajardo, "Understanding the enhanced rates of hydrogen evolution on dissolving magnesium," *Electrochem. Comm.*, **104** (2019) 106482.

257. Tianshu Li, J. R. Scully, and G. S. Frankel, "Localized Corrosion: Passive Film Breakdown *vs*. Pit Growth Stability Part V: Validation of A New Framework for Pit Growth Stability Using One-Dimensional Artificial Pit Electrodes," *J. Electrochem. Soc.*, **166** (2019) C3341-C3354. DOI 10.1149/2.0431911jes

256. Aline D. Gabbardo, G. Viswanathan, G. S. Frankel, "Application of 2D Pit Growth Method to Mg Thin Films, Part II: Salt Film and Hydrogen Evolution," *J. Electrochem. Soc.*, **166** (2019) C3266-C3274.

255. Aline D. Gabbardo, G. S. Frankel, "Application of 2D Pit Growth Method to Mg Thin Films, Part I: Initiation, Growth and Repassivation," *J. Electrochem. Soc.*, **166** (2019) C3254-C3265.

254. Tianshu Li, Orion J. Swanson, G.S. Frankel, Angela Y. Gerard, Pin Lu, James E. Saal, J.R. Scully, "Localized Corrosion Behavior of a Single-phase Non-Equimolar High Entropy Alloy Designed by Integrated Computational Materials Engineering," *Electrochim. Acta*, **306** (2019) 71-84.

253. Tianshu Li, J.R. Scully, and G.S. Frankel, "Localized Corrosion: Passive Film Breakdown *vs*. Pit Growth Stability Part IV: The Role of Salt Film in Pit Growth - A Mathematical Framework," *J. Electrochem. Soc.*, **166** (2019) C115-C124.

252. G. S. Frankel, "Perspective on "Metastable Pitting of Stainless Steel," *Corrosion*, **75** (2019) 126-128.

251. Yakun Zhu and G. S. Frankel, "Effect of Major Intermetallic Particles on Localized Corrosion of AA2060-T8," *Corrosion*, **6/18** (2019) 29-41.

250. S. Fajardo, J. Bosch and G.S. Frankel, "Anomalous Hydrogen Evolution on AZ31, AZ61 and AZ91 Magnesium Alloys in Unbuffered Sodium Chloride Solution," *Corros. Sci.*, **146** (2019) 163-171.

249. Kathleen F. Quiambao, Stephen J. McDonnell, Daniel K. Schreiber, Angela Y. Gerard, Keren M. Freedy, Pin Lu, James E. Saal, Gerald S. Frankel, John R. Scully, "Passivation of a Corrosion Resistant High Entropy Alloy in Non-oxidizing Sulfate Solutions," *Acta Materialia*, **164** (2019) 362-376.

248. P. Gore, S. Fajardo, N. Birbilis, G.S. Frankel, and V.S. Raja, "Anodic activation of Mg in the presence of In^{3+} ions in dilute sodium chloride solution," *Electrochim. Acta*, **293** (2019) 199-210.

247. S. Fajardo, O. Gharbi, N. Birbilis and G.S. Frankel, "Investigating the Effect of Ferrous Ions on the Anomalous Hydrogen Evolution on Magnesium in Acidic Ferrous Chloride Solution," *J. Electrochem. Soc.*, **165** (2018) C916-C925.

246. A.M. Panindre, K.H. Chang, T. Weirich, and G.S. Frankel, "Syringe Cell for Electrochemical Testing," *Corrosion*, **74** (2018) 874-850.

245. Yakun Zhu, Kai Sun, G. S. Frankel, and John Allison, "Intermetallic Phases in AA7075-T651 and Their Roles in Localized Corrosion," *J. Electrochem. Soc.*, **165** (2018) C807-C820.

244. Tianshu Li, J.R. Scully, and G.S. Frankel, "Localized Corrosion: Passive Film Breakdown *vs*. Pit Growth Stability, Part III: A Unifying Set of Principal Parameters and Criteria for Pit Stabilization and Salt Film Formation," *J. Electrochem. Soc.*, **165** (2018) C762-C770. DOI 10.1149/2.0251811jes

    Erratum: Localized Corrosion: Passive Film Breakdown vs Pit Growth Stability: Part III. A Unifying Set of Principal Parameters and Criteria for Pit Stabilization and Salt Film Formation, *J. Electrochem. Soc*., **167** (2020) 109001.

243. Aline D. Gabbardo, Xi Wang, Angeire Huggins, G.S. Frankel, "Mechanism of Etching of Al-4.5Mg-1.0Mn Alloy", *Microscopy and Microanalysis*, **24** (2018) 374-386, doi.org/10.1017/S1431927618012400.

242. Tianshu Li, J.R. Scully, and G.S. Frankel, "Localized Corrosion: Passive Film Breakdown *vs*. Pit Growth Stability, Part II: A Model for Critical Pitting Temperature," *J. Electrochem. Soc.*, **165** (2018) 484-491.

241. Shan-Shan Wang, J. Boerstler and G.S. Frankel, "Fundamental Study of Corrosion Preventive Compounds: Part II—Effects on Galvanic Corrosion of Coated Al Alloy Panels Coupled to Noble Fasteners," *Corrosion*, **74**, (2018) 499-508.

240. Pin Lu, James E. Saal, Greg B. Olson, Tianshu Li, Orion J. Swanson, G. S. Frankel, Angela Y. Gerard, Kathleen F. Quiambao, John R. Scully, "Computational Materials Design of a Corrosion Resistant High Entropy Alloy for Harsh Environments," *Scripta Mat.,* **153** (2018) 19–22, doi.org/10.1016/j.scriptamat.2018.04.040.

239. G.S. Frankel, J.D. Vienna, J. Lian, J.R. Scully, S. Gin, J.V. Ryan, J. Wang, S. Kim, W. Windl, and J. Du, "A Comparative Review of the Aqueous Corrosion of Glasses, Crystalline Ceramics, and Metals," *npj Mat. Deg.,* (2018) 2:15; doi:10.1038/s41529-018-0037-2.

238. D. Sun, W.A. Brantley, G.S. Frankel, and R.H. Heshmati, "Potentiodynamic polarization study of the corrosion behavior of palladium-silver dental alloys," *J. Prosthetic Dentistry*, **119** (2018) 650-656.

237. Shan-Shan Wang and G.S. Frankel, "Fundamental Study of Corrosion Preventive Compounds: Part I—Formulation and Characterization," *Corrosion*, **74** (2018) 444-456.

236. I. Milosev and G.S. Frankel, "Conversion Coatings Based on Zirconium and/or Titanium: a Review," *J. Electrochem. Soc*. **165** (2018) C127-C144.

235. Shan-Shan Wang, Jian-Tang Jiang, Guo-Hua Fan, G. S. Frankel and Liang Zhen, "Effects of Long-Term Natural Aging on the Altered Surface Layer on an Al-Zn-Mg-Cu Alloy and on Corrosion Properties," *Electrochim. Acta*, **266** (2018) 34-42.

234. Christopher D. Taylor, Pin Lu, James Saal, G.S. Frankel, J.R. Scully, "Embracing Integrated Computational Materials Engineering of Corrosion Resistant Alloys," *npj Mat. Deg.,* **2** (2018) article 6, doi: 10.1038/s41529-018-0027-4.

233. S. Fajardo, and G.S. Frankel, "A Kinetic Model Explaining the Enhanced Rates of Hydrogen Evolution on Anodically Polarized Magnesium," *Electrochem. Comm.*, **84** (2017) 36-39.

232. Xi Wang and G.S. Frankel, "Protection Mechanism of Al-Rich Epoxy Primer on Aluminum Alloy 2024-T3," *Corrosion*, **73** (2017) 1192-1195.

231. M.S. Thomson and G.S. Frankel, "Atmospheric Pitting Corrosion Studies of AA7075-T6 Under Electrolyte Droplets, Part I: Effects of Droplet Size, Concentration, Composition, and Sample Aging," *J. Electrochem. Soc.*, **164** (2017) C653-C663.

230. G.S. Frankel, J. Vienna, J. Lian, "WastePD, An Innovative Center on Materials Degradation," *npj Mat. Deg.*, 1 (2017) 5, https://www.nature.com/articles/s41529-017-0002-5.

229. M.I. Iannuzzi, K.L. Vasanth, and G.S. Frankel, “Unusual Correlation Between SKPFM and Corrosion of Nickel Aluminum Bronzes,” *J. Electrochem. Soc.*, **164** (2017) C488-C497.

228. Shan-Shan Wang, Fan Yang and G.S. Frankel, “Effect of Altered Surface Layer on Localized Corrosion of AA2024,” *J. Electrochem. Soc.*, **164** (2017) C317-C323.

227. Shan-Shan Wang, Guo-Hua Fan, Jian-Tang Jiang, A. M. Panindre, G.S. Frankel and Liang Zhen, “Accelerated Precipitation and Growth of Intermetallic Phases in an Al-Zn-Mg-Cu Alloy Processed by Surface Abrasion,” *Acta Mat.,* **131** (2017) 233-245.

226. Dalila C. Sicupira, Ronaldo C. Junior, Alexandre Q. Bracarense, G.S. Frankel, Vanessa de F. C. Lins, “Electrochemical study of passive films formed on welded lean duplex stainless steel,” *Mat. Corr.*, **20** (2017) 604-612.

225. M. Esmaily, S. Fajardo, J.E. Svensson, N. Birbilis, G.S. Frankel, S. Thomas, R. Arrabal, S. Virtanen, L.G. Johansson, “Fundamentals and Advances in Magnesium Alloy Corrosion,” *Prog. Mat. Sci,* **89** (2017) 92-193. https://doi.org/10.1016/j.pmatsci.2017.04.011

224. S. Fajardo, C.F. Glover, G. Williams and G.S. Frankel, “The Evolution of Anodic Hydrogen on High Purity Magnesium in Acidic Buffer Solution,” *Corrosion*, **73** (2017) 482-493.

223. N. W. Khun, S. Adhikari, Y.Y. Li, G.S. Frankel, J. McGee, T. Smith, B. Bammel, J. Zimmerman, “Corrosion Protection of Galvanized Steel by a Thin Hybrid Coating with Zr-Rich Inorganic Matrix and Organic Polymer Beads,” *Corrosion*, **73** (2017) 339-346.

222. Dalila C. Sicupira, G. S. Frankel, Vanessa De F. C. Lins, "Cyclic polarization study of thick welded joints of lean duplex stainless steel," *Mat. Res.*, **20,** (2017) 161-167.

221. G.S. Frankel, T. Li, and J.R. Scully, “Perspective - Localized Corrosion: Passive Film Breakdown vs. Pit Growth Stability,” *J. Electrochem. Soc.*, **164** (2017) C180-C181. DOI 10.1149/2.1381704jes

220. Jiheon Jun, G.S. Frankel, and N. Sridhar, “Further modeling of chloride concentration and temperature effects on 1D pit growth,” *J. Electrochem. Soc.*, **163** (2016) C823-C829.

219. Jinyang Zhu, Lining Xu, Zhicao Feng, G. S. Frankel, Mingxu Lu, and Wei Chang, “Galvanic Corrosion of a Welded Joint in 3Cr Low Alloy Pipeline Steel,” *Corr. Sci.*, **111** (2016) 391-403.

218. S. Fajardo, C.F. Glover, G. Williams, and G.S. Frankel, “The Source of Anodic Hydrogen Evolution on Ultra High Purity Magnesium,” *Electrochim. Acta*, **212** (2016) 510-521.

217. N. W. Khun and G.S. Frankel, “Delamination of polyurethane/multiwalled carbon nanotube composite coatings from steel substrates,” *Prog. Org. Coat.*, 99 (2016) 55-60.

216. Zhicao Feng and G. S. Frankel, "Evaluation of Coated Al Alloy Using the Breakpoint Frequency Method," *Electrochim. Acta*, **187** (2016) 605-615.

215. Ju Kang, Zhicao Feng, G. S. Frankel, I-Wen Huang, Guoqing Wang, Aiping Wu, "Friction Stir Welding of Al Alloy 2219-T8: Part 2-Mechanical and Corrosion Properties," *Metall. Mater. Trans. A*, **47**, (2106) 4566-4577.

214. Ju Kang, Zhicao Feng, G. S. Frankel, I-Wen Huang, Guoqing Wang, Aiping Wu, "Friction Stir Welding of Al Alloy 2219-T8: Part 1-Evolution of Precipitates and Formation of Abnormal Al_2Cu Agglomerates," *Metall. Mater. Trans. A*, **47**, (2106) 4553-4565.

213. Ju Kang, Zhicao Feng, G. S. Frankel, Jichao Li, Guisheng Zou, Aiping Wu, "Effect of precipitates evolution on the pitting corrosion of friction stir welded joints of an Al-Cu alloy," *Corrosion*, **72** (2016) 719-731.

212. Dalila C. Sicupira, G.S. Frankel, and Vanessa de F. C. Lins. "Pitting corrosion of welds in UNS S32304 lean duplex stainless steel," *Mat. Corr.*, **67** (2016) 440-448.

211. Zhicao Feng, G. S. Frankel, W.H. Abbott, and C.A. Matzdorf, "Galvanic Attack of Coated Al Alloy Panels in Laboratory and Field Exposure," *Corrosion*, **72** (2016) 342-355.

210. Jinwook Seong, G.S. Frankel, and N. Sridhar, "Inhibition of Stress Corrosion Cracking of Sensitized AA5083," *Corrosion,* **72** (2016) 284-296.

209. Jiheon Jun, G.S. Frankel, and N. Sridhar, "Effect of Chloride Concentration and Temperature on Growth of 1D Pit," *J. Sol. State Electrochem.,* **19** (2015) 3439-3447.

208. N. W. Khun and G. S. Frankel, "Composition and corrosion protection of hexafluorozirconic acid treatment on steel," *Mat. Corr.,* **66** (2015) 1215-1222.

207. G.S. Frankel, "2015 Whitney Award Lecture, The Effects of Microstructure and Composition on Al Alloy Corrosion," *Corrosion*, **71** (2015) 1308-1320.

206. G.S. Frankel, "Magnesium alloys: Ready for the Road," News and Views, *Nature Materials*, **14**, (2015) 1189–1190.

205. S. Fajardo and G.S. Frankel, "Gravimetric Method for Hydrogen Evolution Measurements on Dissolving Magnesium," *J. Electrochem. Soc*., **162** (2015) C693-C701.

204. Kerrie Holguin, F. Scheltens, G.S. Frankel, "Scanning Transmission Electron Microscopy Analysis of Substrate/Coating Interfacial Regions on AA2024-T3 After Blister Formation," *Surf. Coat. Tech.*, **281** (2015) 51-61.

203. Christine E. Sanders, Dominique Verreault, G. S. Frankel, and Heather C. Allen, "The Role of Sulfur in the Atmospheric Corrosion of Silver," *J. Electrochem. Soc.*, **162** (2015) C630-C637.

202. G.S. Frankel, S. Fajardo, and B. M. Lynch, "Introductory Lecture on Corrosion Chemistry: A Focus on Anodic Hydrogen Evolution on Al and Mg," *Farad. Disc.*, **180** (2015) 11 - 33.

201. Zhicao Feng, Joshua Boerstler, G. S. Frankel, and C.A. Matzdorf, "Effect of Surface Pretreatment on Galvanic Attack of Coated Al Alloy Panels," *Corrosion*, **71** (2015) 771-783.

200. Jinwook Seong, G.S. Frankel, and N. Sridhar, "Corrosion Inhibition of Sensitized and Solutionized AA5083," *J. Electrochem. Soc.,* **162** (2015) C449-C456.

199. L. Rossrucker, A. Samaniego, J.-P. Grote, A.M. Mingers, C.A. Laska, N. Birbilis, G.S. Frankel and K.J.J. Mayrhofer, "The pH Dependence of Magnesium Dissolution and Hydrogen Evolution During Anodic Polarization," *J. Electrochem. Soc.*, **162** (2015) C333-C339.

198. S. Fajardo and G.S. Frankel, "Effect of Impurities on the Negative Difference Effect in Ultra High Purity Magnesium," *Electrochim. Acta,* **165** (2015) 255-267.

197. S. Thomas, N.V. Medhekar, G.S. Frankel and N. Birbilis, "Corrosion mechanism and hydrogen evolution on Mg," *Current Opinion Sol. State Mat. Sci.*, **19** (2015) 85-94.

196. Jinwook Seong, Fan Yang, Frank Scheltens, G.S. Frankel, and N. Sridhar, "Influence of the Altered Surface Layer on the Corrosion of AA5083," *J. Electrochem. Soc.,* **162** (2015) C209-C218.

195. N.W. Khun and G.S. Frankel, "Effect of hexafluorozirconic acid pretreatment on cathodic delamination of epoxy coatings from steel substrates," *Corrosion*, **71**, (2015) 277-284.

194. Shan-Shan Wang, I-Wen Huang, Li Yang, Jian-Tang Jiang, Jun-Feng Chen, Sheng-Long Dai, David. N. Seidman, G. S. Frankel, and Liang Zhen, "Effect of Cu Content and Aging Conditions on Pitting Corrosion Damage of 7000 Series Aluminum Alloys," *J. Electrochem. Soc.*, **162** (2015) C150-C160.

193. A. Samaniego, N. Birbilis, X. Xia and G.S. Frankel, "Hydrogen Evolution During Anodic Polarization of Mg Alloyed with Li, Ca, or Fe," *Corrosion,* **71** (2015) 224-233.

192. A. Samaniego, B.A. Hurley, and G.S. Frankel, "On the Evidence for Univalent Mg," *J. Electroanal. Chem.*, **737** (2015) 123-128.

191. S.M. Cambier, D. Verreault, and G.S. Frankel, "Raman Investigation of Anodic Undermining of Coated Steel During Environmental Exposure," *Corrosion*, **70,** (2014) 1230-1237.

190. S.M. Cambier, and G.S. Frankel, "Filiform Corrosion of PVB- and Eponol-Coated Steel After Standard Laboratory Exposures," *Corrosion*, **70,** (2014) 1219-1229.

189. Shan-Shan Wang, Jian-Tang Jiang, Guo-Hua Fan, Li Yang, Sheng-Long Dai, G.S. Frankel,

and Liang Zhen, "Microstructure evolution in abrasion-induced surface layer on an Al-Zn-Mg-Cu alloy," *Mat. Char.*, **98** (2014) 18-25.

188. O. Lopez-Garrity and G.S. Frankel, "Corrosion Inhibition of AA2024-T3 by Praseodymium Chloride," *Corrosion*, **70,** (2014) 928-941.

187. Shan-Shan Wang, Jian-Tang Jiang, Sheng-Long Dai, D.N. Seidman, G.S. Frankel, and Liang Zhen, "Effect of surface roughness on breakdown behavior of Al-Zn-Mg-Cu alloy," *J. Electrochem. Soc.*, **161**, (2014) C433-C440.

186. S.M. Cambier and G.S. Frankel, "Coating and Interface Degradation of Coated Steel, Part 2: Accelerated Laboratory Tests," *Electrochim. Acta*, **136,** (2014) 442-449.

185. O. Lopez-Garrity and G.S. Frankel, "Synergistic Corrosion Inhibition of AA2024-T3 by Sodium Silicate and Sodium Molybdate," *ECS Electrochem. Lett.*, **3** (2014) C33-C35.

184. N. W. Khun, G.S. Frankel, M. Sumption, "Effects of normal load, sliding speed and surface roughness on tribological properties of niobium under dry and wet conditions," *Tribology Trans.*, **57**, (2014) 944-954.

183. G.S. Frankel, "Electrochemical Techniques in Corrosion: Status, Limitations, and Needs," *ASTM J. Test. Eval*., **42** (2014) 517.

182. B.C. Rincon Troconis and G.S. Frankel, "Effects of Pretreatments on the Adhesion of Acetoacetate to AA2024-T3 using the Blister Test," *Corrosion*, **70**, (2014) 483-495.

181. Anawati, G.S. Frankel, A. Agarwal and N. Sridhar, "Degradation and deactivation of Sn catalyst used for CO_2 reduction as function of overpotential," *Electrochim. Acta*, **133**, (2014) 188-196.

180. S.M. Cambier, R. Posner, and G.S. Frankel, "Coating and Interface Degradation of Coated Steel, Part 1: Field Exposure," *Electrochim. Acta*, **133** (2014) 30-39.

179. S.C. Morton and G.S. Frankel, "Atmospheric Pitting Corrosion of AA7075-T6 Under Evaporating Droplets With and Without Inhibitors," *Mat. Corr.,* **64** (2014) 351-361.

178. N. Birbilis, A.D. King, S. Thomas, G.S. Frankel and J.R. Scully, "Evidence for enhanced catalytic activity of magnesium arising from anodic dissolution," *Electrochim. Acta*, **132** (2014) 277-283.

177. O. Lopez-Garrity and G. S. Frankel, "Corrosion Inhibition of AA2024-T3 by Sodium Silicate," *Electrochim. Acta*, **130** (2014) 9-21.

176. G.S. Frankel, X.-B. Chen, R.K. Gupta, S. Kandasamy, and N. Birbilis, "Effect of Vacuum System Base Pressure on Corrosion Resistance of Sputtered Al Thin Films," *J. Electrochem. Soc.,* **161** (2014) C195-C200.

175. L. Rossrucker, K.J.J. Mayrhofer, G.S. Frankel, and N. Birbilis, "Investigating the real time dissolution of Mg using online analysis by ICP-MS," *J. Electrochem. Soc.*, **161** (2014) C115-119.

174. O. Lopez-Garrity and G.S. Frankel, "Corrosion Inhibition of AA2024-T3 by Sodium Molybdate," *J. Electrochem. Soc.*, **161** (2014) C95-C106.

173. Xiaoji Li, F. Gui, Hongbo Cong, C.S. Brossia, G.S. Frankel, "Evaluation of Nitrate and Nitrite Reduction Kinetics Related to Liquid-Air-Interface Corrosion," *Electrochim. Acta*, **117**, (2014) 299-309.

172. Zhicao Feng, G.S. Frankel, and C.A. Matzdorf, "Quantification of Accelerated Corrosion Testing of Coated AA7075-T6," *J. Electrochem. Soc.*, **161** (2014) C42-C49.

171. Xiaoji Li, Hongbo Cong, F. Gui, C.S. Brossia, and G.S. Frankel, "Development of Liquid-Air-Interface Corrosion of Steel in Nitrate Solutions," *Corrosion*, **70** (2014) 230-246.

170. Jiheon Jun, K. Holguin, and G.S. Frankel, "Pitting Corrosion of Very Clean 304 Stainless Steel," *Corrosion*, **70** (2014) 146-155.

169. N.W. Khun, B.C. Rincon Troconis, G.S. Frankel, "Effects of carbon filler content on adhesion strength and wear and corrosion resistance of epoxy composite coatings on AA2024-T3," *Prog. Org. Coat.*, **77** (2014) 72-80.

168. Zhicao Feng and G.S. Frankel "Galvanic Test Panels for Accelerated Corrosion Testing of Coated Al Alloys, Part II: Measurement of Galvanic Interaction," *Corrosion*, **70** (2014) 95-106.

167. J. F. Chen, G.S. Frankel, J. T. Jiang, C. Y. Xu, L. Zhen, "Effect of age-forming on corrosion properties of an Al-Zn-Mg-Cu alloy," *Mat. Corr.*, **65** (2014) 670-677.

166. L. Cao, G.S. Frankel, N. Sridhar, "Effect of Oxygen on Ethanol SCC Susceptibility, Part 2: Dissolution-Based Cracking Mechanism," *Corrosion*, **69** (2013) 851-862.

165. L. Cao, G.S. Frankel, N. Sridhar, "Effect of Oxygen on Ethanol SCC Susceptibility, Part 1: Electrochemical Response and Cracking-Susceptible Potential Region," *Corrosion*, **69** (2013) 768-780.

164. B.C. Rincon Troconis and G.S. Frankel, "Effect of Roughness and Surface Topography on Adhesion of PVB to AA2024-T3 using the Blister Test," *Surf. Coat. Tech.*, **236** (2013) 531–539.

163. Xiaoji Li, Hongbo Cong, F. Gui, C.S. Brossia, and G.S. Frankel, "Examination of Mechanisms for Liquid-Air-Interface Corrosion of Steel in High Level Radioactive Waste Simulants," *J. Electrochem. Soc.*, **160** (2013) C521-C530.

162. Huang Lin and G.S. Frankel, "Accelerated Atmospheric Corrosion Testing of Ag,"

Corrosion, **69** (2013) 1060-1072.

161. C.A. Matzdorf, W.C. Nickerson, B.C. Rincon Troconis, G.S. Frankel, Longfei Li, and R.G. Buchheit, "Galvanic Test Panels for Accelerated Corrosion Testing of Coated Al Alloys, Part I: Concept," *Corrosion*, **69** (2013) 1240-1246.

160. Huang Lin and G.S. Frankel, "Atmospheric corrosion of Cu by UV, Ozone and NaCl," *Corr. Eng. Sci. Tech.*, **48** (2013) 461-468.

159. Shan-Shan Wang, G.S. Frankel, Jian-Tang Jiang, Jun-Feng Chen, Shen-Long Dai, and Liang Zhen, "Mechanism of Localized Breakdown of 7000 Series Aluminum Alloys," *J. Electrochem. Soc.* **160,** (2013) C493-C502.

158. N.W. Khun, M. Sumption and G.S. Frankel, "Smoothening of Niobium by Electropolishing," *J. Appl. Electrochem*., **43** (2013) 829–838.

157. L. Cao, G.S. Frankel, N. Sridhar, "Effect of Chloride on Stress Corrosion Cracking Susceptibility of Carbon Steel in Simulated Fuel Grade Ethanol," *Electrochim. Acta*, **104** (2013) 255-266.

156. Huang Lin, G.S. Frankel, and W. H. Abbott, "Analysis of Ag Corrosion Products," *J. Electrochem. Soc.*, 160 (2013) C345-C355.

155. Huang Lin and G.S. Frankel, "Atmospheric Corrosion of Cu during Constant Deposition of NaCl," *J. Electrochem. Soc.*, 160 (2013) C336-344.

154. N. W. Khun, G.S. Frankel, and J. Zimmerman, "Investigation of surface morphology, wear resistance and adhesiveness of AA6061-T6 treated in a hexafluorozirconic acid based solution," *Corrosion*, **69**, (2013) 259-267.

153. D. Verreault, A.M. Jubb, G.S. Frankel, M. Stratmann, H.C. Allen, R. Posner, "Laser Effects on Volta Potential Transients Recorded by a Kelvin Probe," *ECS Electrochem. Lett.*, **5** (2013) H19-H21.

152. G.S. Frankel, A. Samaniego, and N. Birbilis, "Evolution of Hydrogen at Dissolving Magnesium Surfaces," *Corros. Sci.*, **70**, (2013) 104-111. https://doi.org/10.1016/j.corsci.2013.01.017 (T.P. Hoar Prize from the UK Institute of Corrosion)

151. N. W. Khun and G.S. Frankel, "Effects of surface roughness, texture and polymer degradation on cathodic delamination of epoxy coated steel samples," *Corros. Sci.*, **67**, (2013) 152-160.

150. L. Cao, G.S. Frankel, N. Sridhar, "Supporting Electrolyte for Corrosion and Cracking Studies in Deaerated Simulated Fuel Grade Ethanol," *J. Electrochem. Soc.*, **160,** (2013) C19-C27.

149. M. Kappes, G.S. Frankel, R. Thodla, M. Mueller, N. Sridhar, and R. M. Carranza, "Hydrogen Permeation and Corrosion Fatigue Crack Growth Rates of X65 Pipeline Steel Exposed to Acid Brines Containing Thiosulfate or Hydrogen Sulfide," *Corrosion*, 68 (2012) 1015-1028.

148. M. Kappes, G.S. Frankel, N. Sridhar, and R. M. Carranza, "Corrosion Behavior of Carbon Steel in Acidified Thiosulfate-Containing Brines," *Corrosion*, 68 (2012) 872-884.

147. A. Chandra, M. Sumption, G.S. Frankel, "On the Mechanism of Niobium Electropolishing," *J. Electrochem. Soc.*, **259** (2012) C485-C491.

146. R. Posner, A.M. Jubb, G.S. Frankel, M. Stratmann, H.C. Allen, "Simultaneous in-situ Kelvin Probe and Raman spectroscopy analysis of electrode potentials and molecular structures at polymer covered salt layers on steel," *Electrochim. Acta*, **76**, (2102) 327-334.

145. R. Posner, A.M. Jubb, G.S. Frankel, M. Stratmann, H.C. Allen, "A simultaneous Kelvin Probe and Raman spectroscopy approach for surface and interface analysis," *Electrochim. Acta*, **76**, (2012) 34-42.

144. Y. Guo and G.S. Frankel, "Characterization of Trivalent Chromium Process Coating on AA2024-T3," *Surf. Coat. Tech.*, **206**, (2012), 3895-3902.

143. M. Kappes, G.S. Frankel, N. Sridhar, and R. M. Carranza, "Reaction Paths of Thiosulfate during Corrosion of Carbon Steel in Acidified Brines," *J. Electrochem. Soc.*, **159** (2012) C195-C204.

142. Y. Guo and G.S. Frankel, "Active Corrosion Inhibition of AA2024-T3 by Trivalent Chrome Process Treatment," *Corrosion*, **68**, (2012) 045002-1-045002-10.

141. Saikat Adhikari, G.S. Frankel, Brian D. Bammel and John Zimmerman, "AFM Scratching for Adhesion Studies of Thin Polymer Coatings on Steel," *J. Adhesion Sci. Tech.*, **26** (2012) 1591-1609.

140. J. Seong and G.S. Frankel, "Assessment of Coating Adhesion Degradation by AFM Scratching," *Corrosion*, 6**8,** (2012) 032501.

139. L.M. Chiacchiarelli, Y. Zhai, G.S. Frankel, A.S. Agarwal, and N. Sridhar, "Cathodic degradation mechanisms of pure Sn electrocatalyst, Part 1: Nitrogen atmosphere," *J. Appl. Electrochem.*, **42** (2012) 21-29,

138. J.W. Sowards, D. Liang, B.T. Alexandrov, G.S. Frankel, J.C. Lippold, "Solidification Behavior and Weldability of Dissimilar Welds Between a Cr-free Ni-Cu Welding Consumable and Type 304L Austenitic Stainless Steel" *Metallurgical and Materials Transactions A*, **43A** (2012) 1209-1222.

137. E. Nunez Moran, Y.H. Kim, and G.S. Frankel, "Localized Corrosion Resistance of 21Cr Ferritic Stainless Steel," *Corrosion*, **67** (2011) 095005-1 – 095505-8.

136. A. Seyeux, G.S. Frankel, N. Missert, K.A. Unocic, L.H. Klein, A. Galtayries, P. Marcus, "ToF-SIMS Imaging Study of the Early Stages of Corrosion in Al-Cu Thin Films," *J. Electrochem. Soc*, **158** (2011) C165-C171.

135. Jeffrey W. Sowards, Dong Liang, Boian T. Alexandrov, Gerald S. Frankel, John C. Lippold, "A New Chromium-Free Welding Consumable for Joining Austenitic Stainless Steels," *Welding J.*, **90** (2011) 63S-76S. (William Sprarragen Award from the American Welding Society)

134. J.F. Li, B. Maier, and G.S. Frankel, "Corrosion of an Al-Mg-Si alloy under $MgCl_2$ Solution Droplets," *Corros. Sci.,* **53** (2011) 2142-2151.

133. B. Maier and G.S. Frankel, "Behavior of Magnesium-Rich Primers on AA2024-T3," *Corrosion,* **67**, (2011) 055001-1 - 055001-15.

132. M. Atapour, A. Pilchak, G.S. Frankel, and J.C. Williams "Corrosion behavior of β titanium alloys for biomedical applications," *Mat. Sci. Eng. C*, **31** (2011), 885-891.

131. Bastian Maier and G.S. Frankel, "Pitting Corrosion of Silica Coated SS304 Under Thin Electrolyte Layers," *Corrosion*, **67,** (2011) 035004-1 - 035004-10.

130. Saikat Adhikari, K.A.Unocic, Y. Zhai, G.S. Frankel, John Zimmerman, and W. Fristad, "Hexafluorozirconic Acid Based Surface Pretreatments: Characterization and Performance Assessment," *Electrochim. Acta*, **56** (2011) 1912–1924.

129. M. Atapour, A. Pilchak, G.S. Frankel, J.C. Williams, M.H. Fathi, and M. Shamanian, "Corrosion Behavior of Ti-6Al-4V with Different Thermomechanical Treatments and Microstructures," *Corrosion*, **66** (2010) 065004-1 to 065004-9.

128. M. Atapour, A. Pilchak, G.S. Frankel, and J.C. Williams "Corrosion Behavior of Friction Stir and Gas Tungsten Arc Welded Ti-6Al-4V," *Met. Mat. Trans. A*, **41**, (2010) 2318-2327.

127. Anawati, B. Graver, H. Nordmark, Z. Zhao, G.S Frankel, John Walmsley, and Kemal Nisancioglu, "Multilayer Corrosion of Aluminum Activated by Lead," *J. Electrochem. Soc.* **157** (2010) C313-C320.

126. Bastian Maier and G.S. Frankel, "Pitting Corrosion of Bare Stainless Steel 304 under Chloride Solution Droplets," *J. Electrochem. Soc.,* **157***,* (2010) C302-C312.

125. M. Kappes, G.S. Frankel and N. Sridhar, "Study of Adhesion and Adhesion Degradation of a Pressure Sensitive Tape on Carbon Steel," *Prog. Org. Coat.,* **69** (2010) 57-62.

124. M. Atapour, A. Pilchak, G.S. Frankel, and J.C. Williams "Corrosion Behavior of Investment Cast and Friction Stir Processed Ti-6Al-4V," *Corros. Sci.,* **52** (2010) 3062–3069.

123. Gerald Sigua, Saikat Adhikari, G.S. Frankel and Melvin A. Pascall, "The Use of Atomic Force Microscopy to Measure the Efficacies of Various Chemical Sanitizers in Removing Organic Matter from Glass Surfaces" *J. Food Eng.,* **100** (2010) 139-144.

122. Z. Y. Chen, D. Liang, G. Ma, G.S. Frankel, H. Allen, and R.G. Kelly, "Influence of UV Irradiation and Ozone on the Atmospheric Corrosion of Bare Silver," *Corr. Eng. Sci. Tech.*, **45,** (2010) 169-180.

121. D. Liang, J.W. Sowards, G.S. Frankel, B.T. Alexandrov and J.C. Lippold, "Corrosion Resistance of Welds in 304L Stainless Steel Made with a Nickel-Copper-Ruthenium Welding Consumable," *Corros. Sci.* **52** (2010) 2439-2451.

120. D. Liang, H.C. Allen, G.S. Frankel, Z.Y. Chen, and R.G. Kelly, "Effects of Sodium Chloride Particles, Ozone, UV, and Relative Humidity on Atmospheric Corrosion of Silver," *J. Electrochem. Soc.*, **157**, (2010) C146-156.

119. D. Liang, J.W. Sowards, G.S. Frankel, B.T. Alexandrov and J.C. Lippold, "A Corrosion Study of Nickel-Copper and Nickel-Copper-Palladium Welding Filler Metals," *Mat. Corr.*, **61,** (2010) 909-919.

118. S. Taira and G.S. Frankel, "Localized Corrosion of Ni Based Alloys Under Thin Electrolyte Layers," *Corrosion & Materials (Australia)*, **35 (1),** (2010) 39-47.

117. G.S. Frankel, "Assessing Corrosion Education," *Mat. Perf.*, **48** (2009) 28-34.

116. Aldo Handojo, Yumei Zhai, Gerald Frankel and Melvin A. Pascall, "Measurement of adhesion strengths between various milk products on glass surfaces using contact angle measurement and atomic force microscopy," *J. Food Eng.,* **92** (2009) 305-311.

115. G.S. Frankel and M. Stratmann, "Future Perspectives of Corrosion Science," *Corros. Eng. Sci. Tech.,* **44**, (2009) 328-331.

114. A.K. Mishra and G.S. Frankel, "Crevice Corrosion Repassivation of Alloy 22 in Aggressive Environments," *Corrosion,* **64**, (2008) 836-844.

113. G. S. Frankel and N. Sridhar, "Understanding Localized Corrosion," *Materials Today*, **11** (2008) 38-44.

112. M. Kappes, L. Kovarik, M.J. Mills, G.S. Frankel, and M.K. Miller, "The Usefulness of Ultra-High Resolution Microstructural Studies for Understanding Localized Corrosion Behavior of Al Alloys," *J. Electrochem. Soc.*, **155**, (2008) C437-C443.

111. G. S. Frankel, "Electrochemical Techniques in Corrosion; Status, Limitations and Needs," *J. ASTM Int.*, **5**, Issue 2 (2008) online **ISSN:** 1546-962X, **DOI:** 10.1520/JAI101241, http://www.astm.org/JOURNALS/JAI/TOC/JAI522008.htm.

110. Tsai-Shang Huang, Shang Zhao, G. S. Frankel and D. A. Wolfe, "A Statistical Model for Localized Corrosion in 7xxx Aluminum Alloys," *Corrosion,* **65**, (2007) 819-827.

109. E. Tada and G. S. Frankel, "Effect of Particulate Silica Coatings on Localized Corrosion Behavior of AISI 304SS under Atmospheric Corrosion Conditions," *J. Electrochem. Soc.,* **154**, (2007) C318-C325.

108. E. Tada and G. S. Frankel, "Electrochemical Behavior of AISI 304SS with Silica Coating in 0.1 M NaCl," *J. Electrochem. Soc.,* **154**, (2007) C312-C317.

107. Tsai-Shang Huang and G. S. Frankel, "Effects of Temper and Potential on Localized Corrosion Kinetics of AA7075," *Corrosion,* **65**, (2007) 731-743.

106. Zhijun Zhao and G. S. Frankel, "Surface Layer Dissolution Kinetics of AA7075 in Various Tempers," *Corrosion*, **63,** (2007) 613-624.

105. M. Iannuzzi and G. S. Frankel, "Inhibition of AA2024-T3 Corrosion by Vanadates: An AFM Scratching Investigation" *Corrosion,* **63,** (2007) 672-688.

104. Zhijun Zhao and G. S. Frankel, "The Effect of Temper on the First Breakdown in AA7075," *Corros. Sci.*, **49**, (2007) 3089-3111.

103. Zhijun Zhao and G. S. Frankel, "On the First Breakdown in AA7075-T6," *Corros. Sci.*, **49**. (2007) 3064-3088.

102. M. Iannuzzi and G. S. Frankel, "Mechanisms of Corrosion Inhibition of AA2024-T3 by Vanadates" *Corros. Sci.*, **49,** (2007) 2371-2391.

101. Shang Zhao, Douglas A. Wolfe, Tsai-Shang Huang, and Gerald S. Frankel, "Generalized Model for IGC Growth in Aluminum Alloys," *J. Statistical Planning and Inference,* **137**, (2007) 2405-2412.

100. G. S. Frankel, M. Stratmann, M. Rohwerder, A. Michalik, B. Maier, J. Dora, and M. Wicinski, "Potential control under thin aqueous layers using a Kelvin Probe," *Corros. Sci.*, **49,** (2007) 2021-2036.

99. M. Iannuzzi, J. Kovac, and G. S. Frankel, "A Study of the Mechanisms of Corrosion Inhibition of AA2024-T3 by Vanadates Using the Split Cell Technique," *Electrochim Acta,* **52**, (2007) 4032-4042.

98. Yeong Ho Kim and G. S. Frankel, "Effect of Noble Element Alloying on Passivity and Passivity Breakdown of Ni," *J. Electrochem. Soc.*, **154** (2007) C36-C42.

97. Xinyan Zhao and G. S. Frankel, "Quantitative Study of Exfoliation Corrosion: Exfoliation of Slices in Humidity Technique," *Corros. Sci.*, **49** (2007) 920-938.

96. Tsai-Shang Huang and G. S. Frankel, "Sharp Intergranular Corrosion Fissures in AA7178," *Corros. Sci.,* **49** (2007) 858-876.

95. Xiaodong Liu, G. S. Frankel, B. Zoofan and S.I. Rokhlin, "In Situ Observation of Intergranular Stress Corrosion Cracking in AA2024-T3 under Constant Load Conditions," *Corros. Sci*. **49** (2007) 139-148. (T.P. Hoar Prize from the UK Institute of Corrosion)

94. Xinyan Zhao and G. S. Frankel, "Effects of RH, Temper and Stress on Exfoliation Corrosion Kinetics of AA7178," *Corrosion*, **62** (2006) 256-266.

93. M. Iannuzzi, T. Young and G. S. Frankel, "Aluminum Alloy Corrosion Inhibition by Vanadates," *J. Electrochem. Soc.*, **153** (2006) B533-B541.

92. Xiaodong Liu and G. S. Frankel, "Effects of Compressive Stress on Localized Corrosion in AA2024-T3," *Corros. Sci.,* **48** (2006) 3309-3329.

91. Tsai-Shang Huang and G. S. Frankel, "The Influence of the Grain Structure on Anisotropic Localized Corrosion Kinetics of AA7xxx-T6 Alloys," *Corros. Eng. Sci. Tech.,* **41** (2006) 192-199.

90. B. Zoofan, J.-Y. Kim, S. I. Rokhlin, and G. S. Frankel, "Phase-contrast X-ray imaging for nondestructive evaluation of materials," *J. Appl. Phys.,***100** (2006) 014502-1 – 014502-7.

89. Yeong Ho Kim, G. S. Frankel, and J. C. Lippold, "Development of a Chromium-free Consumable for Austenitic Stainless Steels: Effect of Dilution and the Behavior of Bead-on-Plate Welds," *ISIJ International*, **46**, (2006) 698-704.

88. Xiaodong Liu, G. S. Frankel, B. Zoofan and S. I. Rokhlin, "In Situ X- ray Radiographic Study of Stress Corrosion Cracking in AA2024-T3," *Corrosion*, **62**, 217-230 (2006).

87. Yeong Ho Kim, G. S. Frankel and J. C. Lippold "Cr-free Consumables for Welding Stainless Steel. Part 2: Optimization of Alloy Composition Based on Corrosion Behavior," *Corrosion*, **62**, 109-120 (2006).

86. Xiaodong Liu, G. S. Frankel, B. Zoofan and S.I. Rokhlin, "The Transition from Intergranular Corrosion to Intergranular Stress Corrosion Cracking in AA2024-T3, *J. Electrochem. Soc.*, **153,** B42-B51 (2006).

85. Yeong Ho Kim, G. S. Frankel, J. C. Lippold and G. Guaytima, "Cr-free Consumables for Welding Stainless Steel. Part 1: Monel," *Corrosion*, **62**, 44-53 (2006).

84. Jiho Kang and G. S. Frankel, "Potentiostatic Pulse Testing for Assessment of Early Coating Failure," *Z. Phys. Chemie*, **219**, 1519-1538 (2005).

83. B. Zoofan, J.-Y Kim, S. I. Rokhlin and G. S. Frankel, “Application of Phase-Contrast Microradiography in NDT,” *Mat. Eval.*, **63,** 1122-1127 (2005).

82. Qingjiang Meng and G. S. Frankel, "Effect of Cu Content on Chromate Conversion Coating Protection of 7xxx-T6 Aluminum Alloys," *Corrosion*, **60,** 897-904 (2004).

81. Qingjiang Meng and G. S. Frankel, "Effect of Cu Content on Corrosion Behavior of 7xxx Series Aluminum Alloys," *J. Electrochem. Soc.*, **151**, B271-283 (2004).

80. Qingjiang Meng and G. S. Frankel, "Characterization of Chromate Conversion Coating on AA7075-T6 Aluminum Alloy," *Surf. Int. Anal.,* **36**, 30-42 (2004).

79. Patrick P. Leblanc and G. S. Frankel, "Investigation of Filiform Corrosion of Epoxy-Coated 1045 Carbon Steel by Scanning Kelvin Probe Force Microscopy," *J. Electrochem. Soc*, **151** B105-113 (2004).

78. Q. Meng, G. S. Frankel, H. O. Colijn and S. H. Goss, "High Resolution Characterization of the Region around MnS Inclusions in Stainless Steel Alloys, *Corrosion*, **60**, 346-355 (2004).

77. Shiling Ruan, D. A. Wolfe, and G. S. Frankel, "Statistical Modeling and Computer Simulation of Intergranular Corrosion Growth in AA2024-T3 Aluminum Alloy," *J. Stat. Plan. Inference*, **126,** 553-568 (2004).

76. Xiaodong Liu, G. S. Frankel, B. Zoofan and S. I. Rokhlin, "Effect of Applied Tensile Stress on Intergranular Corrosion of AA2024-T3," *Corros. Sci.*, **46**, 405-425 (2004).

75. S. Ruan, D. Wolfe, Weilong Zhang, and G. S. Frankel, "Statistical Modeling of Minimum Intergranular Corrosion Path Length in High Strength Aluminum Alloy," *Technometrics*, **46**, 69-75 (2004).

74. X. Zhao, G. S. Frankel, B. Zoofan, and S. I. Rokhlin, "In situ X-Ray Radiographic Study of Intergranular Corrosion in Al Alloys," *Corrosion*, **59**, 1012-1018 (2003).

73. G. M. Omweg, G. S. Frankel, W. A. Bruce, and G. Koch, "The Performance of Welded High-Strength Low-Alloy Steels in Sour Environments," *Corrosion*, **59**, 640-53 (2003).

72. Q. Meng, G. S. Frankel, H. O. Colijn and S. H. Goss, "Characterization of the Region around MnS Inclusions in Stainless Steel Alloys," *Nature*, **424**, 389-90 (2003).

71. G. M. Omweg, G. S. Frankel, W. A. Bruce, J.E. Ramirez, and G. Koch, "Effect of Welding Parameters and H_2S Partial Pressure on the Susceptibility of Welded HSLA Steels to Sulfide Stress Cracking," *Weld. J.*, **82**, 136-144S (2003). (W.H. Hobart Award from the American Welding Society, 2003)

70. Y. Baek and G. S. Frankel, "Electrochemical Quartz Crystal Microbalance Study of Corrosion of Phases in AA2024," *J. Electrochem. Soc.*, **150**, B1-B9 (2003).

69. P. Schmutz, V. Guillaumin, S. Lillard, J. Lillard and G. S. Frankel, "Influence of Dichromate Ions on Corrosion Processes on Pure Magnesium," *J. Electrochem. Soc.*, **150**, B99-B110 (2003).

68. Weilong Zhang, S. Ruan, D. Wolfe, and G. S. Frankel, "Statistical Model for Intergranular Corrosion Growth Kinetics," *Corros. Sci.*, **45,** 353-370 (2003).

67. E. Akiyama, A. J. Markworth, J. K. McCoy, G. S. Frankel, L. Xia, and R. L. McCreery, "Storage and Release of Soluble Hexavalent Chromium from Chromate Conversion Coatings on Al Alloys; Kinetics of Release," *J. Electrochem. Soc.*, **150**, B83-B91 (2003).

66. Weilong Zhang and G. S. Frankel, "Transitions between Pitting and Intergranular Corrosion in AA2024," *Electrochim. Acta*, **48**, 1193-1210 (2003).

65. G. S. Frankel and P. Leblanc, "Studies of Corrosion using Scanning Kelvin Probe Force Microscopy and AFM Scratching," *Corros. Sci. and Tech.* (Korea), **31**, 419-425 (2002).

64. Weilong Zhang and G. S. Frankel, "Localized Corrosion Growth Kinetics in AA2024," *J. Electrochem. Soc.*, **149**, B510-B519 (2002).

63. P. Leblanc and G. S. Frankel, "A Study of Corrosion and Pitting Initiation of AA2024-T3 Using Atomic Force Microscopy" *J. Electrochem. Soc.*, **149,** B239-B247 (2002).

62. T. Ramgopal, P. I. Gouma, and G. S. Frankel, "Role of Grain Boundary Precipitates and SDZ on the Intergranular Corrosion of Aluminum Alloy AA7150" *Corrosion*, **58,** 687-697 (2002).

61. W. J. Clark, J. D. Ramsey, R. L. McCreery, G. S. Frankel, "A Galvanic Corrosion Approach to Investigating Chromate Effects on Aluminum Alloy 2024-T3," *J. Electrochem. Soc.*,**149**, B179-B185 (2002).

60. D. Lu, P. Schmutz and G. S. Frankel, "Effect of Chromate on Open Circuit Pit Growth in Al Thin Films" *Corrosion*, **58**, 137-144 (2002).

59. Q. Meng, T. Ramgopal and G. S. Frankel, "The Influence of Inhibitor Ions on Dissolution Kinetics of Al and Mg Using Artificial Crevice Technique," *Electrochem. Solid-State Lett.*, **5**, B1-B4 (2002).

58. G. S. Frankel and R. L. McCreery, "Inhibition of Al Alloy Corrosion by Chromates," *Interface,* **10**, 34-38 (2001).

57. T. Ramgopal and G. S. Frankel, "Role of Alloying Additions on the Dissolution Kinetics of Aluminum Binary Alloys using Artificial Crevice Electrodes" *Corrosion*, **57**, 702-711 (2001).

56. T. Ramgopal, P. Schmutz and G. S. Frankel, "Electrochemical Behavior of Thin Film Analogs of $Mg(Zn,Cu,Al)_2$" *J. Electrochem. Soc.*, **149**, B348 (2001).

55. J. Zhao, L. Xia, A. Sehgal, D. Lu, R. L. McCreery, and G. S. Frankel, "Effects of Chromate and Chromate Conversion Coatings on Corrosion of AA2024-T3," *Surface and Coatings Technology*, **140**, 51-57 (2001).

54. V. Guillaumin, P. Schmutz, and G. S. Frankel, "Characterization of Corrosion Interfaces by the Scanning Kelvin Probe Force Microscopy Technique" *J. Electrochem. Soc.*, **148**, B163-173 (2001).

53. L. Xia, E. Akiyama, G. S. Frankel, and R. L. McCreery, "Storage and Release of Soluble Hexavalent Chromium from Chromate Conversion Coatings: Equilibrium Aspects of Cr^{VI} Concentration," *J. Electrochem. Soc.,* **147**, 2556-2562 (2000).

52. W. Zhang and G. S. Frankel, "Anisotropy of Localized Corrosion in AA2024-T3," *Electrochem. Solid-State Lett.*, **3** 268-270 (2000).

51. D. Devecchio, P. Schmutz, and G. S. Frankel, "In situ AFM Scratching as an Analog to Metal CMP," *Electrochem. Solid-State Lett.*, **3** 90 (2000).

50. A. Sehgal, G. S. Frankel, B. Zoofan and S. Rokhlin, "Pit Growth Study in Al Alloys by the Foil Penetration Technique," *J. Electrochem. Soc.*, **147**, 140-148 (2000).

49. P. Schmutz and G. S. Frankel, "Influence of Dichromate Ions on Corrosion of Pure Aluminum and AA2024-T3 in NaCl Solution Studied by AFM Scratching," *J. Electrochem. Soc.*, **146,** 4461-4472 (1999).

48. E. Akiyama and G. S. Frankel, "The Influence of Dichromate Ions on Al Dissolution Kinetics in Artificial Crevice Electrode Cells," *J. Electrochem. Soc.*, **146,** 4095-4100 (1999).

47. J. Zhang and G. S. Frankel, "Corrosion-Sensing Behavior of an Acrylic-Based Coating System," *Corrosion*, **55,** 957-967 (1999).

46. M. A. Al-Anezi, G. S. Frankel, and A. K. Agrawal, "Investigation of the Susceptibility of Conventional ASTM A516-70 Pressure Vessel Steel to HIC and SOHIC in H_2S-Containing DGA Solutions, *Corrosion,* **55,** 1101-1109 (1999).

45. A. J. Markworth, A. Sehgal and G. S. Frankel, "Oxidation of Zr-2.5Nb Nuclear Reactor Pressure Tubes: A New Model," *J. Electrochem. Soc.*, **146,** 3672-3678 (1999).

44. Z. Xia and G. S. Frankel, "Localized Corrosion and Stress Corrosion Cracking Resistance of Friction Stir Welded Al Alloy 5454," *Corrosion,* **55**, 139-150 (1999).

43. A. Sehgal, D. Lu, and G.S. Frankel, "Pitting in Aluminum Thin Films; Supersaturation and Effects of Dichromate Ions," *J. Electrochem. Soc.,* **145**, 2834-2840 (1998).

42. P. Schmutz and G. S. Frankel, “Characterization of AA 2024-T3 by Scanning Kelvin Probe Force Microscopy,” *J. Electrochem. Soc.,* **145**, 2285-2295 (1998). DOI 10.1149/1.1838633

41. P. Schmutz and G. S. Frankel, “Corrosion Study of AA2024-T3 by Scanning Kelvin Probe Force Microscopy and *In Situ* AFM Scratching,” *J. Electrochem. Soc.,* **145**, 2295-2306 (1998).

40. J. Zhao, G. S. Frankel, and R. L. McCreery, “Corrosion Protection of Untreated AA2024-T3 in Chloride Solution by Chromate Conversion Coating Monitored with Raman Spectroscopy”, *J. Electrochem. Soc.,* **145**, 2258-2264 (1998).

39. G. S. Frankel, “Pitting Corrosion of Metals; A Review of the Critical Factors,” *J. Electrochem. Soc*., **145**, 2186-2198 (1998). DOI 10.1149/1.1838615

    Erratum: Pitting Corrosion of Metals; A Review of the Critical Factors, *J. Electrochem. Soc*., **145**, 2970 (1998).

38. G. S. Frankel, “Pit Growth in Thin Metallic Films,” *Mat. Sci. For.,* **247,** 1-8 (1997).

37. G. S. Frankel, C. V. Jahnes, and J. R. Scully, "Repassivation of Pits in Aluminum Thin Films," *J. Electrochem. Soc*., **143**, 1834-1840 (1996).

36. G. S. Frankel, S. Purushothaman, T. A. Petersen, S. Farooq, S. N. Reddy, and V. Brusic, "Corrosion and Adhesion of Multilayer Pad Structures for Packaging Applications," *IEEE-CPMT, Part B*, **18,** 709-714 (1995).

35. G. S. Frankel, C. V. Jahnes, V. Brusic, and A. J. Davenport, "Repassivation Transients Measured with the Breaking Electrode Technique on Al Thin Film Samples," *J. Electrochem. Soc.,* **142**, 2290-2295 (1995).

34. V. Brusic, G. S. Frankel, J. Roldan, and R. Saraf, "Corrosion and Protection of a Conductive Silver Paste," *J. Electrochem. Soc*., **142**, 2591-2594 (1995).

33. G. S. Frankel, A. G. Schrott, A. J. Davenport, H. S. Isaacs, C. V. Jahnes, and M. A. Russak, "X-Ray Absorption Study of Electrochemically Grown Oxide Films on AlCr Sputtered Alloys: II. *In situ* Studies," *J. Electrochem. Soc.*, **141**, 83 (1994).

32. G. S. Frankel, V. Brusic, R. G. Schad, and J. W. Chang, "Pitting Corrosion of Electroplated Permalloy Films," *Corros. Sci.*, **35,** 63 (1993).

31. A. J. Davenport, H. S. Isaacs, J. A. Bardwell, B. MacDougall, G. S. Frankel, and A. G. Schrott, "In Situ Studies of Passive Film Chemistry Using X-ray Absorption Spectroscopy," *Corros. Sci., **35,*** 19 (1993).

30. G. S. Frankel, R C. Newman, C. V. Jahnes, and M. A. Russak, "On the Pitting Resistance of Sputter-Deposited Aluminum Alloys," *J. Electrochem. Soc.*, **140**, 2192-2197 (1993).

29. V. Brusic, G. S. Frankel, A. G. Schrott, T. A. Petersen, and B. M. Rush, "Corrosion Inhibition of Cobalt with a Thin Film of Cu-BTA," *J. Electrochem. Soc.*, **140**, 2507 (1993).

28. A. G. Schrott and G. S. Frankel, "Application of X-ray Spectroscopy to the Study of Electrochemically-formed Surface Oxide Films," *IBM J. Res. Dev.*, **37**, 191 (1993).

27. V. Brusic, G. S. Frankel, C-K. Hu, M. M. Plechaty, F. B. Kaufman, and G. C. Schewartz, "Corrosion and Protection of Thin Line Conductors in VLSI Structures," *IBM J. Res. Dev.*, **37**, 173-188 (1993).

26. G. S. Frankel, A. G. Schrott, H. S. Isaacs, W. J. Horkans, and P. C. Andricacos, "Behavior of Cu(P) and OFHC Cu Anodes Under Electrodeposition Conditions," *J. Electrochem. Soc.*, **140**, 959 (1993).

25. G. S. Frankel, J. O. Dukovic, B. M. Rush, V. A. Brusic, and C. V. Jahnes, "Pit Growth in NiFe Thin Films," *J. Electrochem. Soc.*, **139**, 2196-2201 (1992).

24. G. S. Frankel, A. J. Davenport, H. S. Isaacs, A. G. Schrott, C. V. Jahnes, and M. A. Russak, "X-Ray Absorption Study of Electrochemically Grown Oxide Films on AlCr Sputtered Alloys: I. *Ex situ* Studies," *J. Electrochem. Soc.,* **139**, 1812 (1992).

23. V. Brusic, G. S. Frankel, B. M. Rush, A. G. Schrott, C. V. Jahnes, M. A. Russak, and T. Petersen, "Corrosion and Passivation of Fe and FeN Films," *J. Electrochem. Soc.*, **139,** 1530-1535 (1992).

22. A. G. Schrott, G. S. Frankel, A. J. Davenport, C. V. Jahnes, M. A. Russak, "Reply to Comments on Auger Emmision and Photoreduction of Hexavalent Cr Oxides," *Surface Sci.*, **273,** L480 (1992).

21. V. Brusic, M. A. Frisch, B. N. Eldridge, F. B. Kaufman. T. A. Petersen, A. G. Schrott, and G.S. Frankel, "Growth Kinetics, Polymerization and Protection of Cu-X-BTA Films," in *Control of Copper and Copper Alloys Oxidation,* Editions de la Revue de Metallurgie, Paris (1992), p. 127.

20. V. Brusic, M.A. Frisch, B.N. Eldridge, F.P. Novak, F.B. Kaufman, B.M. Rush, and G.S. Frankel, "Copper Corrosion With and Without Inhibitors," *J. Electrochem. Soc.,* **138**, 2253 (1991).

19. A. G. Schrott, G. S. Frankel, A. J. Davenport, H. S. Isaacs, C. V. Jahnes, and M. A. Russak, "Cr LVV Auger Emission and Photoreduction of Hexavalent Cr Oxides," *Surface Sci.*, **250**, 139 (1991).

18. G. S. Frankel, B. M. Rush, C. V. Jahnes, C. E. Farrell, A. J. Davenport, and H. S. Isaacs, "Repassivation Transients Measured with Thin Film Breaking Electrodes," *J. Electrochem. Soc.*, **138**, 643-644 (1991).

17. A. J. Davenport, H. S. Isaacs, G. S. Frankel, A. G. Schrott, C. V. Jahnes, and M. A. Russak, "In-situ X-ray Absorption Study of Chromium Valency Changes in Passive Oxides on Sputtered AlCr Thin Films Under Electrochemical Control," *J. Electrochem. Soc.*, **138**, 337 (1991).

16. V. A. Brusic, G. S. Frankel, C.-K. Hu, M. M. Plechaty, and B. M. Rush, "Corrosion Study of an Al-Cu Alloy Exposed to Reactive Ion Etching," *Corrosion,* **47**, 35 (1991).

15. G. S. Frankel, "Pit Stability in Stainless Steel: The Transition from Metastability," in *Advances in Localized Corrosion,* H. Isaacs, U. Bertocci, J. Kruger, and S. Smialowska, eds., NACE, Houston, (1990) p. 137.

14. S. L. Cohen, V. A. Brusic, F. B. Kaufman, G. S. Frankel, S. Motakef, and B. Rush, "X-ray Photoelectron Spectroscopy and Ellipsometry Studies of the Electrochemically Controlled Absorption of Benzotriazole on Copper Surfaces," *J. Vac. Sci. Technol. A*, **8**, 2417 (1990).

13. G. S. Frankel, "The Growth of 2-D Pits in Thin Film Aluminum," *Corros. Sci.*, **30**, 1203-1218 (1990).

12. V. Brusic, M. Russak, R. Schad, G. Frankel, A. Selius, and D. DiMilia, "Corrosion of Thin Film Magnetic Disk: Galvanic Effects of the Carbon Overcoat," *J. Electrochem. Soc.*, **136**, 42-46 (1989).

11. G. S. Frankel, M. A. Russak, C. V. Jahnes, M. Mirzamaani, and V. A. Brusic, "Pitting of Sputtered Aluminum Alloy Thin Films," *J. Electrochem. Soc.*, **136**, 1243-1244 (1989).

10. G. S. Frankel, C. V. Jahnes, and M. A. Russak, "Masking Technique for Thin-Film Corrosion Specimens to Minimize Crevice Corrosion," *Corrosion*, **45**, 630 (1989).

9. F. Hunkeler, G. S. Frankel, and H. Bohni, "On the Mechanism of Localized Corrosion," *Corrosion,* **43**, 189-191 (1987).

8. G. S. Frankel, L. Stockert, F. Hunkeler and H. Boehni, "Metastable Pitting of Stainless Steel," *Corrosion*, **43**, 429-436 (1987). https://doi.org/10.5006/1.3583880

7. G. S. Frankel and R. M. Latanision, "Effect of Hydrogen on the Easy Glide Extent in Single Crystal Nickel," *Scripta Met.*, **20**, 681 (1986).

6. G. S. Frankel and R. M. Latanision, "Hydrogen Transport During Deformation in Nickel, Part II: Single Crystal Nickel," *Met. Trans.*, **17A**, 869 (1986).

5. G. S. Frankel and R. M. Latanision, "Hydrogen Transport During Deformation in Nickel, Part I: Polycrystalline Nickel," *Met. Trans.,* **17A**, 861 (1986).

4. G. S. Frankel and R. M. Latanision, "The Interaction of Hydrogen Permeation and Deformation in Poly- and Single Crystal Nickel," Proc. 9th Int. Congress on Metallic Corrosion, Toronto, Canada (1984).

3. G. S. Frankel and R. M. Latanision, "Effect of Joule Heating in Electrochemical Measurement of Hydrogen Transport. Reply," *Scripta Met.*, **16**, 1097 (1982).

2. M. Kurkela, G. S. Frankel, R. M. Latanision, S. Suresh, and R. O. Ritchie, "Influence of Plastic Deformation on Hydrogen Transport in 2 1/4 Cr - 1 Mo Steel," *Scripta Met.,* **16,** 455 (1982).

1. F. J. Hohn, T. H. P. Chang, A. N. Broers, G. S. Frankel, E. T. Peters, and D. W. Lee, "Fabrication and Testing of Single-Crystal Lanthanum Hexaboride Rod Cathodes," *J. Appl. Phys.,* **53,** 1283 (1982).

Book Chapters

19. G.S. Frankel, "Fundamentals of Corrosion Kinetics," in *Self Repairing Protective Coatings*, A.E. Hughes, ed. Springer, 2016.

18. G. Frankel, "Techniques for Corrosion Quantification," in *Characterization of Materials*, 2nd Ed., E.N. Kaufmann, ed. Wiley VCH, NY, 2012.

17. J.W. Sowards, B.T. Alexandrov, J.C. Lippold, G.S. Frankel, "Weldability of a New Ni-Cu Welding Consumable for Joining Austenitic Stainless Steels." Hot Cracking Phenomena in Welds III, J. Lippold et al. (eds.), pp. 393 413. Berlin Heidelberg: Springer-Verlag. DOI: 10.1007/978-3-642-16864-2_20., 2011.

16. G. S. Frankel and J. W. Braithwaite, "Corrosion in Microelectronic and Magnetic Data-Storage Devices," in *Corrosion Mechanisms in Theory and Practice, 3rd Ed.,* edited by P. Marcus, CRC Press, 2011.

15. G.S. Frankel, "Uniform Corrosion and Passivity," in Shreir's Corrosion, T.J.A. Richardson, R.A. Cottis, R. Lindsay, S. Lyon, D.J.D. Scantlebury, H. Stott, M. Graham, Elsevier Science, (2009).

14. M. Rohwerder, P. Leblanc, G.S. Frankel, and M. Stratmann, "Application of Scanning Kelvin Probe in Corrosion Science," in *Analytical Methods in Corrosion Science and Engineering,* P. Marcus and F. Mansfeld, editors, pp. 605-648, CRC Press LLC, 2006.

13. S. I. Rokhlin, B. Zoofan, G. S. Frankel, "Microradiographic and Foil Penetration Methods for Quantification of Localized Corrosion," in *Nondestructive Materials Characterization with Application to Aerospace Materials*, N. Meyendorf, P. Nagy, S. Rokhlin, editors, Springer-Verlag GmbH & Co. 2003.

12. C. Druffner, E. Schumaker, S. Sathish, G.S. Frankel, P. Leblanc, "Scanning Probe Microscopy - Ultrasonic Force and Kelvin Probe," in *Nondestructive Materials Characterization with Application to Aerospace Materials*, N. Meyendorf, P. Nagy, S. Rokhlin, editors, Springer-Verlag GmbH & Co. 2003.

11. N. Meyendorf, D. Eylon, G. Frankel, J. Hoffmann, M. Khobaib, V. Kramb, H. Rösner, S. Sathish, E. Shell, "Degradation of Aircraft Structures" in *Nondestructive Materials*

Characterization with Application to Aerospace Materials, N. Meyendorf, P. Nagy, S. Rokhlin, editors, Springer-Verlag GmbH & Co. 2003.

10. M. Rohwerder P. Leblanc, G.S. Frankel, and M. Stratmann, "Application of Scanning Kelvin Probe in Corrosion Science," in *Methods for Corrosion Science and Engineering*, Philippe Marcus and Florian Mansfeld, editors, Marcel Dekker, Inc., 2003.

9. G. S. Frankel, "Introduction to Metallurgically Influenced Corrosion in *Metals Handbook*, Vol 13A, S. D. Cramer and B. S. Covino, Jr., eds, ASM International, 2003.

8. G. S. Frankel, "Pitting Corrosion," in *Metals Handbook*, Vol 13A, S. D. Cramer and B. S. Covino, Jr., eds, ASM International, 2003.

7. G. S. Frankel and D. Landolt, "Corrosion Fundamentals," in *Encyclopedia of Electrochemistry,* edited by A. J. Bard and M. Stratmann, *Vol. 4, Corrosion and Oxide Films*, edited by M. Stratmann and G. S. Frankel, pp. 3-8, Wiley-VCH, Weinheim, Germany, 2003.

6. G. S. Frankel and D. Landolt, "Thermodynamics," in *Encyclopedia of Electrochemistry,* edited by A. J. Bard and M. Stratmann, *Vol. 4, Corrosion and Oxide Films*, edited by M. Stratmann and G. S. Frankel, pp. 9-24, Wiley-VCH, Weinheim, Germany, 2003.

5. G. S. Frankel and D. Landolt, "Kinetics," in *Encyclopedia of Electrochemistry,* edited by A. J. Bard and M. Stratmann, *Vol. 4, Corrosion and Oxide Films*, edited by M. Stratmann and G. S. Frankel, pp. 25-49, Wiley-VCH, Weinheim, Germany, 2003.

4. D. Landolt and G. S. Frankel, "Mass Transport," in *Encyclopedia of Electrochemistry,* edited by A. J. Bard and M. Stratmann, *Vol. 4, Corrosion and Oxide Films*, edited by M. Stratmann and G. S. Frankel, pp. 50-61Wiley-VCH, Weinheim, Germany, 2003.

3. G. S. Frankel and M. Rohwerder, "Experimental Techniques for Corrosion," in *Encyclopedia of Electrochemistry,* edited by A. J. Bard and M. Stratmann, *Vol. 4, Corrosion and Oxide Films*, edited by M. Stratmann and G. S. Frankel, pp. 687-723, Wiley-VCH, Weinheim, Germany, 2003.

2. G. S. Frankel and J. W. Braithwaite, "Corrosion in Microelectronic and Magnetic Data-Storage Devices," chapter of book entitled *Corrosion Mechanisms in Theory and Practice, 2nd Ed.,* edited by P. Marcus, Marcel Dekker, New York, 2002.

1. G. S. Frankel, "Corrosion in Microelectronic and Magnetic Storage Devices," chapter of book entitled *Corrosion Mechanisms in Theory and Practice,* edited by P. Marcus and J. Oudar, Marcel Dekker, New York, 1995.

Edited Books

8. G. S. Frankel, "Metallurgical Influenced Corrosion," subsection in *Metals Handbook*, Vol 13A, S. D. Cramer and B. S. Covino, Jr., eds, ASM International, 2003.

7. S. Virtanen, P. Schmuki, and G. S. Frankel, *Critical Factors in Localized Corrosion IV,* eds., PV2002-24, The Electrochemical Society, Pennington, NJ (2003).

6. M. Stratmann and G. S. Frankel, eds., *Encyclopedia of Electrochemistry*, Volume 4, Wiley-VCH, 2003.

5. G. S. Frankel, H. S. Isaacs, J. R. Scully, and J. D. Sinclair, eds., *Corrosion Science: A Retrospective and Current Status in Honor of Robert P. Frankenthal*, PV2002-13, The Electrochemical Society, Pennington, NJ (2002).

4. G. S. Frankel and J. R. Scully, eds., *Localized Corrosion,* Proceedings of NACE 2001 Research Topical Symposium.

3. R. G. Kelly, P. M. Natishan, G. S. Frankel, and R. C. Newman, eds., "Critical Factors in Localized Corrosion III, A Symposium in Honor of the 70th Birthday of Jerome Kruger," PV 98-17, The Electrochemical Society, Pennington, NJ (1998).

2. P. M. Natishan, R. G. Kelly, G. S. Frankel and R. C. Newman, eds., "Critical Factors in Localized Corrosion II," PV 95-15, The Electrochemical Society, Pennington, NJ (1996).

1. G. S. Frankel and R. C. Newman, eds., "Critical Factors in Localized Corrosion," PV 92-9, The Electrochemical Society, Pennington, NJ (1992).

Proceedings Papers and Unreviewed Reports

95. C. Taylor, L. Bland, G. Frankel, Y. Zhu, J. Garofano, K. Smith, “Predicting Corrosion Fatigue Behavior using a Bayesian Network that Integrates Microstructure, Electrochemistry and Fracture Mechanics,” NACE paper 2018-11228, NACE International, 2018.

94. S.M. Cambier and G.S. Frankel, “Degradation of Coatings and Coating Interfaces on Steel,” proceedings of the 19th ICC in Jeju, Korea, 2014.

93. Dalila C. Sicupira, Gerald Frankel, Vanessa de F. C. Lins, “Use of the electrochemical microcell technique for studying pitting corrosion at welded joints of lean duplex stainless steel UNS S32304,” Eurocorr conference paper, 2014.

92. J. A. Beavers, C. S. Brossia, F. Gui, C. Scott, H. Cong, N. Sridhar, G.S. Frankel, B. J. Wiersma, K. Boomer, “Stress Corrosion Cracking of Carbon Steel in Nitrate-Based Hanford Waste Simulant Environments,” NACE paper 2014-3754, NACE International, 2014.

91. Hongbo Cong, C. S. Brossia, J. A. Beavers, G.S. Frankel, Kayle D. Boomer, Glenn Edgemon, and B. J. Wiersma, Leon Stock, Michael Terry, “A Review on the Liquid Air Interface Corrosion Study of Carbon Steel in Hanford Waste Simulants,” NACE paper 2013-2836, NACE International, 2013.

90. M. Kappes, G.S. Frankel, N. Sridhar, and R. Thodla, “Evaluation of $S_2O_3^{2-}$ as a Substitute for H_2S in Corrosion Fatigue Studies,” Proceedings of Corrosion and Prevention 2012, ACA, Melbourne, Australia.

89. A. Chandra, G. S. Frankel and M. D. Sumption, "Electropolishing of Niobium to Obtain Defect Free Surfaces," Proceedings of SRF2011, Chicago, IL.

88. Hongbo Cong, C. S. Brossia, J. A. Beavers, G.S. Frankel, Kayle D. Boomer, Glenn Edgemon, and B. J. Wiersma, Leon Stock, "Evaluation of Laboratory Screening Techniques for Liquid Air Interface Corrosion in Nuclear Waste Simulants," NACE paper 2012-1562, NACE International, 2012.

87. B. Bammel, T. Smith, J. McGee, J. Comoford, J. Zimmerman, G. Donaldson, S. Adhikari, Y-Y. Li, G.S. Frankel, "Corrosion Inhibition by Release on Demand: Initial Study of Novel Commercial Non-Chrome Thin Organic Coatings (TOC)," Galvatech 2011 conference paper 127, Genova, 2011.

86. Hongbo Cong, C. S. Brossia, J. A. Beavers, Glenn Edgemon, Kayle D. Boomer, Gerald Frankel, and B. J. Wiersma, "An Electrochemical Study of Liquid Air Interface Corrosion in Dilute Hanford Nuclear Waste," NACE paper 18667, NACE International, 2011.

85. J.W. Sowards, B.T. Alexandrov, J.C. Lippold, and G.S. Frankel," Weldability of a New Ni-Cu Welding Consumable for Joining Austenitic Stainless Steels," in "Hot Cracking Phenomena in Welds III", Eds. T. Boellinghaus, C. Cross, and J. Lippold, , Springer, 2010.

84. Feng Gui, Hongbo Cong, C. S. Brossia, J. A. Beavers, Glenn Edgemon, Kayle D. Boomer, Gerald Frankel, and B. J. Wiersma, "Study on the Interfacial Corrosion of Carbon Steel in Dilute Hanford Waste Simulants," NACE paper, NACE International, 2010.

83. Colin S. Scott, Feng Gui, C. S. Brossia, J. A. Beavers, Glenn Edgemon, Kayle D. Boomer, Gerald Frankel, and Bruce J. Wiersma, "The Sensitivity of Carbon Steels' Susceptibility to Localized Corrosion to the pH of Nitrate Based Nuclear Wastes," NACE paper, NACE International, 2010.

82. B. Maier, S. Taira and G. S. Frankel, "Localized Corrosion under Droplets and Thin Electrolyte Layers," Proceedings of 2009 Australasian Corrosion Association Meeting, Coffs Harbour, Australia, 11/09.

81. C. S. Scott, F. Gui, C. S. Brossia, J. A. Beavers, G.L. Edgemon, Kayle D. Boomer, G. Frankel, B.J. Wiersma and L. Stock, "A Study of Stress Corrosion Cracking and Localized Corrosion of Carbon Steel in Nitrate Based Nuclear Waste," NACE paper 094349, NACE International, 2009.

80. Y. Zhai, G.S. Frankel, J. Zimmerman and W. Fristad, "Hexafluorozirconic Acid Surface Treatments for Steel Substrates," Proceedings of 2008 International Steel Technologies Symposium, Kaohsiung, Taiwan, 11/08.

79. D. Liang, G. Ma, H.C. Allen, G.S. Frankel, Z. Chen and R.G. Kelly, "Role of ozone and UV light in atmospheric corrosion of Ag," Proceedings of 2008 EuroCorr meeting, Edinburgh, 2008.

78. Y. Zhai, Y. Guo, G.S. Frankel, J. Zimmerman and W. Fristad, "Chromate-Free and Phosphate-Free Surface Treatments for Al Alloy and Steel Substrates," Proceedings of the 17th ICC, Las Vegas, 2008.

77. F. Gui, C.S. Brossia, J. A. Beavers, G. S. Frankel, G. Edgemon, and H. Berman, "A Study on Localized Corrosion of Carbon Steel in Hanford Nuclear Wastes," NACE paper 08589, NACE International, 2008.

76. C. S. Brossia, C. Scott, J. Beavers, G. Edgemon, H. Berman, G. Frankel, and K. Boomer, "Stress Corrosion Cracking of Carbon Steel in Nitrate and Carbonate Wastes at Hanford," NACE paper 08599, NACE International, 2008.

75. Y. Zhai, Z. Zhao, G.S. Frankel, J. Zimmerman, T. Bryden and W. Fristad, "A Replacement for Phosphate Conversion Coating Based on Hexafluorozirconic Acid," Proceedings of 2008 SAE Congress.

74. J.W. Sowards, B.T. Alexandrov, J.C. Lippold, D. Liang, G.S. Frankel, "Development of a Cr-free Shielded Metal Arc Welding Consumable for Stainless Steel," *Stainless Steel World 2007*, KCI Publishing BV, Zutphen, The Netherlands, pp.,.

73. Y. Zhai, Z. Zhao, G.S. Frankel, J. Zimmerman, T. Bryden and W. Fristad, "Surface Pretreatment Based On Dilute Hexafluorozirconic Acid," Proceedings of 2007 Triservice Corrosion Conference, Denver.

72. C. Scott, F. Gui, C.S. Brossia, J. Beavers, G. Edgemon, H. Berman, K. Boomer, and G. Frankel, "A Study of Corrosion and Stress Corrosion Cracking of Carbon Steel Nuclear Waste Storage Tanks," proceedings of 2007 MS&T conference, Detroit.

71. A. K. Mishra and G.S. Frankel, "Repassivation of Alloy 22 Crevice Corrosion at 90°C," proceedings of 2007 MS&T Conference, Detroit.

70. F. Gui, C.S. Brossia, J.A. Beavers, C. Mendez, G. S. Frankel, G. L. Edgemon, H. Berman, "On the Anodic Polarization Behavior of Carbon Steel in Hanford," NACE paper 07593, NACE International, 2007.

69. C.S. Brossia, C. Scott, J.A. Beavers, M.P.H. Brongers, G.L. Edgemon, H. Berman, G.S. Frankel, "Inhibition of Stress Corrosion Cracking of Carbon Steel Storage Tanks at Hanford," NACE paper 07606, NACE International, 2007.

68. M. Iannuzzi and G. S. Frankel, "Corrosion Inhibition of AA2024-T3 by Vanadates," in *Critical Factors in Localized Corrosion 5, A Symposium in Honor of Hugh Isaacs,* The Electrochemical Society, 2006.

67. J.C. Lippold, B.T. Alexandrov, M. Gonser, Y.H. Kim, D. Liang, and G.S. Frankel, "Development of Ni-Cu Filler Metals for Joining Austenitic Stainless Steels," *Stainless Steel World 2005*, KCI Publishing BV, Zutphen, The Netherlands, pp., 2005.

66. Tsai-Shang Huang, Xinyan Zhao, and G.S. Frankel, "Localized Corrosion Growth Kinetics in AA7xxx Alloys," 2005 *Triservice Corrosion Conference Proceedings*, 2005.

65. G. S. Frankel, Eiji Tada, B. Maier, Corrosion Reliability Prediction: Long Term Nuclear Waste Storage in Yucca Mountain," *Proceedings of 16th ICC*, 2005.

64. Yeong Ho Kim, G. S. Frankel, J. C. Lippold, "Effect of Noble Element Alloying on Passivity and Passivity Breakdown of Ni," *Passivity 9*, P. Marcus, ed., Elsevier, 2005.

63. G.S. Frankel, Tsai-Shang Huang, and Xinyan Zhao, "Localized Corrosion Growth Kinetics in AA7178," *Passivity 9*, P. Marcus, ed., Elsevier, 2005.

62. G.S. Frankel and R.G. Buchheit, "The Corrosion Curriculum at the Fontana Corrosion Center," *Proceedings of the 16th ICC*, Beijing, 2005.

61. P. Schmutz, G.S. Frankel, and F. M. Serry, "Corrosion Studies with the Atomic Force Microscope, Part I: Characterization of Potential Inhomogeneities on Passive Surfaces by Surface Potential Imaging," Application Note, Veeco Instruments, 2005.

60. J.C. Lippold, G. Guaytima, G.S. Frankel, and Y.H. Kim, "Development of Ni-Cu Filler Metals for Joining Austenitic Stainless Steels," *Stainless Steel World 2004*, KCI Publishing BV, Zutphen, The Netherlands, pp. 140-148, 2004.

59. Tsai-Shang Huang and G. S. Frankel, "Intergranular Corrosion Morphology and Growth Kinetics in AA7075 and AA7178," in *Corrosion in Marine and Saltwater Environments II* PV 2004-14, D.A. Shifler, T. Tsuru, P.M. Natishan, and S. Ito, eds., The Electrochemical Society, 2004.

58. Xiaodong Liu, G. S. Frankel, B. Zoofan and S. I. Rokhlin, "Imaging and Characterization of Multiple Stress Corrosion Cracks in AA2024-T3 by X-ray Radiography," in *Corrosion in Marine and Saltwater Environments II* PV 2004-14, D.A. Shifler, T. Tsuru, P.M. Natishan, and S. Ito, eds., p 223-231, The Electrochemical Society, 2004.

57. G. S. Frankel and R. L. McCreery, "Inhibition of Al and Al Alloy Corrosion by Chromates," *Ochrona przed Korozja (*Polish journal, *Corrosion Protection)*, Vol 47, No. 7, p 183-187, 2004.

56. B. Zoofan, J.-Y. Kim, S. I. Rokhlin and G. S. Frankel "Phase contrast X-ray imaging for nondestructive evaluation of materials" in *Review of Progress in Quantitative NDE*, D. O. Thompson and D. E. Chimenti, eds., American Institute of Physics, New York, Vol. 23, 546 - 553 (2004).

55. Qingjiang Meng and G.S. Frankel "The Effect of Cu Content on the Localized Corrosion Resistance of AA7xxx-T6 Alloys," in *Corrosion and Protection of Light Metal Alloys,* R.G. Buchheit, R.G. Kelly, B.A. Shaw, and N. Missert, eds. The Electrochemical Society, PV 2003-23, 2003.

54. G. S. Frankel and R. L. McCreery, "Inhibition of Al and Al Alloy Corrosion by Chromates," proceedings of Michal Smialowski International Symposium on Corrosion

and Hydrogen Degradation, T. Zakroczymski, ed., Institute of Physical Chemistry of the Polish Academy of Sciences, 2003.

53. T. Huang, X. Zhao, Gerald Frankel, B. Zoofan and S. Rokhlin, "Growth Kinetics of Intergranular and Exfoliation Corrosion in AA7178," proceedings of Triservice Corrosion Conference, Las Vegas, 2003.

52. X. Liu, Z. Zhao, G. Frankel, B. Zoofan, S. Rokhlin, "Effects of Stress on Localized Corrosion in Al and Al Alloys," proceedings of Triservice Corrosion Conference, Las Vegas, 2003.

51. Belinda Hurley, Mariano Iannuzzi, G.S. Frankel, Richard McCreery, "Covalent bonding of anticorrosion coatings to Aluminum and Copper," proceedings of Triservice Corrosion Conference, Las Vegas, 2003.

50. B. Zoofan, J.-Y. Kim, S. I. Rokhlin and G.S. Frankel, "Phase-contrast X-ray image enhancement of corrosion damage," proceedings of Triservice Corrosion Conference, Las Vegas, 2003.

49. G. S. Frankel, "Corrosion Science in the 21st Century," *J. Corros. Sci. and Eng.*, Vol 6, Paper 028, Proceedings of "Corrosion Science in the 21st Century", UMIST, Manchester, England, 2003, http://www.jcse.org/Volume6/Preprints/V6Preprint16.pdf.

48. X. Zhao and G. S. Frankel**, "**The Visual Determination of Exfoliation Rate of Slices in Humidity**",** *J. Corros. Sci. and Eng.***,** Proceedings of "Corrosion Science in the 21st Century", UMIST, Manchester, England, 2003.

47. X. Zhao, T. Huang, G. S. Frankel, B. Zoofan, and S. I. Rokhlin, " Intergranular Corrosion Morphology And Growth Kinetics In High Strength Aluminum Alloys," in *Critical Factors in Localized Corrosion IV,* S. Virtanen, P. Schmuki, and G. S. Frankel, eds, PV 2002-24, The Electrochemical Society, 2003.

46. G. S. Frankel, J. Kang, and Y. Baek, "Electrochemical Quartz Crystal Microbalance Study on Gold and Phases in AA2024-T3," NACE Paper 03394, NACE, Houston, TX, 2003.

45. T. S. Huang And G. S. Frankel , B. Farahbakhsh, D. Peeler, "Localized Corrosion Growth Kinetics In Al Alloys," Proceedings of the 6TH Joint FAA/DOD/NASA Aging Aircraft Conference, San Francisco, 2002 .

44. G. S. Frankel, "Wagner-Traud to Stern-Geary; Development of Corrosion Kinetics," in *Corrosion Retrospective*, G. S. Frankel, H. S. Isaacs, J. R. Scully, and J. D. Sinclair, eds, The Electrochemical Society, PV 2002-13, 2002.

43. G. S. Frankel, "Localized Corrosion Phenomenology and Controlling Parameters," in *Compilation of Special Topics Reports*, DOE, 2002.

42. G. S. Frankel and R. G. Kelly, "Passivity Induced Ennoblement," in *Compilation of Special Topics Reports*, DOE, 2002.

41. J. H. Payer, J. A. Beavers, T. M. Devine, Jr., G. S. Frankel, R. H. Jones, R. G. Kelly, R. M. Latanision, "Final Report, Waste Package Materials Performance Peer Review Panel," Report to DOE, 2002.

40. G. S. Frankel, "Localized Corrosion Growth Kinetics in Al Alloys," Triservice Corrosion Conference Proceedings, P. Trulove, ed., 2002.

39. G. S. Frankel, "Inhibition of Al Alloy Corrosion by Chromate," Triservice Corrosion Conference Proceedings, P. Trulove, ed., 2002.

38. G. S. Frankel and P. Leblanc, "Studies of Corrosion and Pitting Initiation of AA2024-T3 Using Atomic Force Microscopy," Triservice Corrosion Conference Proceedings, P. Trulove, ed., 2002.

37. G. M. Omweg, G. S. Frankel, W. A. Bruce, and G. Koch, "The Performance Of Welded High-Strength Low-Alloy Steels In Sour Environments," NACE Paper 02048, NACE, Houston, TX, 2002.

36. Y. Baek and G. S. Frankel, "Electrochemical Quartz Crystal Microbalance Study of Corrosion of Phases in AA2024-T3," in *Corrosion and Corrosion Protection*, J. D. Sinclair, E. Kalman, M. W. Kendig, W. Plieth, and W. H. Smyrl, eds, PV 2001- 22, The ECS Proceedings Series, Pennington, NJ (2001).

35. P. Leblanc, V. Laget and G. S. Frankel, "Corrosion Studies of AA2024-T3 Using Scanning Kelvin Probe Force Microscopy," in *State of the Art Application of Surface and Interface Analysis Methods to Environmental Material Interactions, in Honor of James E. Castle's 65th Year,* D.R. Baer, C.R. Clayton, G.P. Halada, and G.D. Davis, Eds, PV 2001-01, The ECS Proceedings Series, Pennington, NJ (2001).

34. G. S. Frankel and P. Leblanc, "Studies of Corrosion using Scanning Kelvin Probe Force Microscopy and AFM Scratching," Proceedings of 12th Asia Pacific Corrosion Control Conference, Seoul, 10/01.

33. G. S. Frankel, "Localized Corrosion of Metals; A Review of the Rate-Controlling Factors in Initiation and Growth," in *Passivity of Metals and Semiconductors*, M. B. Ives, J. L. Luo, and J. R. Rodda, eds., The Electrochemical Society Proceedings Volume 99-42, p. 445 (2001).

32. P. Schmutz and G. S. Frankel, Characterization of Potential Inhomogeneities on Passive Surfaces by Scanning Kelvin Probe Force Microscopy," in *Passivity of Metals and Semiconductors*, M. B. Ives, J. L. Luo, and J. R. Rodda, eds., The Electrochemical Society Proceedings Volume 99-42, p. 537 (2001).

31. G. Frankel, "Techniques for Assessment of Localized Corrosion," in *Localized Corrosion,* G. S. Frankel and J. R. Scully, eds., Proceedings of NACE 2001 Research Topical Symposium.

30. X. Liu, Weilong Zhang, G. S. Frankel, "Intergranular Corrosion and Stress Corrosion Cracking of AA2024-T3," NACE Paper 01233, NACE, Houston, TX, 2001.

29. X. Liu, W. Zhang, G. S. Frankel, "Effect Of Stress on Penetration of Intergranular Corrosion in Aluminum Alloys; Transition of IGC to IGSCC," in *Chemistry and Electrochemistry of Corrosion and Stress Corrosion Cracking*, R. H. Jones, ed., TMS, p. 543, (2001).

28. T. Ramgopal and G. S. Frankel, "Role of Alloying Elements and Intermetallic Particles in the Intergranular Corrosion of AA7150," in *Corrosion and Prevention of Low Density Metals and Alloys*, B. A. Shaw, R. G. Buchheit, and J. P. Moran, eds., The Electrochemical Society Proceedings Volume 2000-23, p. 411 (2000).

27. W. Zhang, X. Liu, and G. S. Frankel, "Effects of Microstructure and Potential on Localized Corrosion Kinetics of AA024-T3," in *Corrosion and Prevention of Low Density Metals and Alloys*, B. A. Shaw, R. G. Buchheit, and J. P. Moran, eds., The Electrochemical Society Proceedings Volume 2000-23, p. 376 (2000).

26. D. Lu, P. Schmutz and G. S. Frankel," Open Circuit Pit Growth In Al Thin Films," in *Second Intl. Symp. on Pits and Pores*, P. Schmuki, ed., The Electrochemical Society Proceedings Volume (2000).

25. V. Guillaumin, P. Schmutz and G. S. Frankel, "Scanning Kelvin Probe Force Microscopy and Auger Electron Spectroscopy Studies of Passive Surfaces," in *Localized In-Situ Methods for Investigating Electrochemical Interfaces,* A. C. Hillier, M. Seo, and S. R. Taylor, eds, The Electrochemical Society Proceedings Volume 99-28, p. 339-350, (1999).

24. D. Devecchio, P. Schmutz, and G. S. Frankel, "A New Approach for the Study of Chemical Mechanical Polishing," in *Third International Symposium on Chemical Mechanical Polishing in IC Device Manufacturing,* Y. A. Arimoto, R. L. Opila, C. Reidsema Simpson, K. B. Sundaram and Y. Homma, eds, The Electrochemical Society Proceedings Volume 99-37, p. 293-300, (1999).

23. E. Akiyama, L. Xia, R. McCreery, A. Markworth, and G. S. Frankel, "Release of Chromate Ions from Chromate Conversion Coatings on Al Alloys," in *International Symposium in Honor of Professor Norio Sato: Passivity and Localized Corrosion,* R. G. Kelly, B. MacDougall, M. Seo and H. Takahashi, eds, The Electrochemical Society Proceedings Volume 99-27, p 300-309, (1999).

22. W. Zhang, T. Ramgopal and G. S. Frankel, "Intergranular Corrosion of High Strength Al Alloys," 1999 Triservice Corrosion Conference, Myrtle Beach.

21. A. Sehgal, G. S. Frankel, B. Zoofan and S. Rokhlin, "Pit Growth Study in Al Alloys by the Foil Penetration Technique" in *Critical Factors in Localized Corrosion III*", R. Kelly, P. Natishan, G. S. Frankel, and R. C. Newman, eds, The Electrochemical Society Proceeding Volume 98-17 p. 519-538, (1999).

20. M. A. Al-Anezi, G. S. Frankel, and A. K. Agrawal, "Investigation of the Susceptibility of Conventional ASTM A516-70 Pressure Vessel Steel to HIC And SIHIC in H_2S-Containing DGA Solutions, NACE Paper 99430, NACE, Houston, TX, 1999.

19. J. Zhang and G. S. Frankel, "Paint as a Corrosion Sensor; Acrylic Coating Systems," in MRS Symposium Proceedings entitled "Nondestructive Characterization of Materials in Aging Systems," R. Crane, J. Achenbach, S. Shah, T. Matikas, and P. Khuri-Yakub, eds., p15-24, Volume 503, The Materials Research Society, Warrendale, PA, 1998.

18. G. S. Frankel, "Pit Growth in Thin Metallic Films," *Electrochemical Methods in Corrosion - Research and Application,* B. Elsener, ed., Trans Tech Publications, Zurich, Switzerland **247,** 1-7 (1997).

17. J. Zhang and G. S. Frankel, "Paint as a Corrosion Sensor; A Comparison of the Sensitivity of Different Coating Systems," 1997 Triservice Corrosion Conference Proceedings, D. Schifler, ed., Wrightsville Beach, 1997.

16. G. S. Frankel, "Corrosion of Electronic and Magnetic Devices and Materials," in *Electrochemical Synthesis and Modification of Materials,* S. G. Corcoran, P. C. Searson, T. P. Moffat, P. Andricacos, and J.L. Delplancke, eds, Materials Research Society, Pittsburgh 541-548 (1997).

15. G. S. Frankel, A. J. Markworth, and A. Sehgal, "Corrosion and Deuterium Ingress in CANDU Pressure Tubes: A Literature Review and New Model," Atomic Energy Control Board of Canada Report, AECB Proj. No. 2.349.1, February, 1997.

14. G. S. Frankel, C. V. Jahnes, and J. R. Scully, "Repassivation of Pits in Aluminum Thin Films," in *Critical Factors in Localized Corrosion II*, P. M. Natishan, R. G. Kelly, G. S. Frankel and R. C. Newman, eds., The Electrochemical Society Proceeding Volume 95-15 (1996) .

13. G.S. Frankel, C.V. Jahnes, V. Brusic, A.J. Davenport, "Repassivation transients measured with the breaking electrode technique on aluminum thin-film samples" in *Proceedings of the H. H. Uhlig Memorial Symposium,* The Electrochemical Society Proceeding Volume 94-26 pp. 138-50 (1995).

12. G. S. Frankel, S. Purushothaman, T. A. Peterson, S. Farooq, S. Reddy, V. Brusic, "Corrosion and Adhesion of Multilayer Pad Structures for Packaging Applications," in *Corrosion and Reliability of Electronic Materials and Devices*, R. B. Comizzoli, R. P. Frankenthal and J. D. Sinclair, eds., The Electrochemical Society Proceeding Volume 94-29 (1994).

11. V. Brusic, G. S. Frankel, J. Roldan, and R. Saraf, “Corrosion and Protection of a Conductive Silver Paste,” in *Corrosion and Reliability of Electronic Materials and Devices*, R. B. Comizzoli, R. P. Frankenthal and J. D. Sinclair, eds., The Electrochemical Society Proceeding Volume 94-29 (1994).

10. V. Brusic, G. S. Frankel, A. G. Schrott, T. A. Peterson, B. Rush, “Corrosion Inhibition of Cobalt with a thin film of Cu-BTA,” in *Corrosion and Reliability of Electronic Materials and Devices*, R. B. Comizzoli and J. D. Sinclair, eds., The Electrochemical Society Proceeding Volume 93-1 (1993).

9. V. Brusic, G.S. Frankel, T.A. Petersen, S-M. Huang, “Experimental approaches to the study of corrosion in thin water layers” in Proceedings of 12th International Corrosion Congress, NACE, Houston 687-99 (1993).

8. V. Brusic, G.S. Frankel, “Corrosion and protection of thin metallic films” in *Proc. Materials Research Society Symposium* 437-48 (1993).

7. G. S. Frankel, J. O. Dukovic, B. M. Rush, V. A. Brusic, and C. V. Jahnes, "Pit Growth in NiFe Thin Films," in *Critical Factors in Localized Corrosion*, G. S. Frankel and R. C. Newman, eds., The Electrochemical Society Proceeding Volume 92-9 (1992).

6. G. S. Frankel, A. G. Schrott, H. S. Isaacs, W. J. Horkans, and P. C. Andricacos, "Behavior of Cu(P) and OFHC Cu Anodes Under Electrodeposition Conditions," in *Oxide Films on Metals and Alloys*, B. R. MacDougall, ed., The Electrochemical Society Proceeding Volume 92-22 (1992).

5. V. Brusic, M. A. Frisch, B. N. Eldridge, F. B. Kaufman. T. A. Petersen, A. G. Schrott, and G.S. Frankel, "Growth Kinetics, Polymerization and Protection of Cu-X-BTA Films," in *Control of Copper and Copper Alloys Oxidation,* Editions de la Revue de Metallurgie, Paris (1992), p. 127.

4. A.J. Davenport, H.S. Isaacs, G.S. Frankel, A.G. Schrott, C.V. Jahnes, M.A. Russak, “In-situ XANES study of the valence state of chromium during electrochemical polarization of aluminum-chromium alloys,” in *X-ray Methods Corros. Interfacial Electrochem*, The Electrochemical Society Proceeding Volume 92-1 pp.261-71 (1992).

3. A.G. Schrott, G.S. Frankel, A.J. Davenport, H.S. Isaacs, C.V. Jahnes, M.A. Russak, “LVV Auger analysis of the decomposition of hexavalent chromium by x-ray irradiation,” in *Appl. Surf. Anal. Methods Environ./Mater. Interact.* The Electrochemical Society Proceeding Volume 91-7 pp. 116-26 (1991).

2. G. S. Frankel, "Pit Stability in Stainless Steel: The Transition from Metastability," in *Advances in Localized Corrosion,* H. Isaacs, U. Bertocci, J. Kruger, and S. Smialowska, eds., NACE, Houston, (1990) p. 137.

1. G. S. Frankel and R. M. Latanision, "The Interaction of Hydrogen Permeation and Deformation in Poly- and Single Crystal Nickel," Proc. 9th Int. Congress on Metallic

Corrosion, Toronto, Canada (1984).

Patents

5. Chao Li, Xiaolei Guo, and G. S. Frankel, “pH Sensitive Capsule and Release System,” U.S. Patent Application PCT/US2020/022413, USPTO: 17/434,211, filing date 3/12/20.

4. G.S. Frankel and J.C. Lippold, “Chromium-Free Welding Consumable,” U.S. Patent, 7,743,967, issued 6/29/2010.

3. G.S. Frankel and J.C. Lippold, “Chromium-Free Welding Consumable,” U.S. Patent, 7,696,453, issued 04/13/2010.

2. G.S. Frankel and J.C. Lippold, “Chromium-Free Welding Consumable,” U.S. Patent 7,425,229, issued 9/16/08.

1. G. S. Frankel, R. G. Buchheit, J. Zhang, "Corrosion Sensing Composition and Method of Use," U.S. Patent Application 09/467 719, February (2000).

Scholarly Presentations (only those given by GSF)

227. “Corrosion, the Pervasive Menace”, Ohio University Chemical Engineering Departmental Seminar Series, 9/11/23, **invited lecture.**

226. “Understanding the Effects of Temperature on Pitting of Stainless Steel,” Univ. Complutense Madrid, 5/19/23, **invited lecture.**

225. “Pitting Corrosion; Challenges and Insights,” CENIM, Madrid, 5/17/23, **plenary lecture.**

224. “Understanding the Effects of Temperature on Pitting of Stainless Steel,” Univ. of Palermo, 4/13/23, **invited lecture.**

223. “Corrosion of Buried Steel at New and In-Service Infrastructure,” Research Technical Symposium, AMPP conference, Denver, 3/22/23.

222. “Repassivation Temperature of One-Dimensional Artificial Pits in Stainless Steel,” ECS meeting, Atlanta, 10/10/22.

221. “Pitting Corrosion Retrospective,” ECS meeting (virtual), 10/13/21, **Olin Pd Award Lecture.**

220. “Anomalous Hydrogen Evolution on Dissolving Mg,” ECS student chapter, Western University, 6/9/21, **invited lecture.**

219. "Corrosion of Single-Phase Ni-Fe-Cr-Mo-W-X Non-Equimolar Multi-Principal Element Alloys," Corrosion and Materials Degradation Web Conference, 5/19/21, **invited lecture.**

218. "A Framework for Pitting Corrosion Based on Pit Growth Stability," CorroZoom webinar series, 4/9/21, **Invited lecture.**

217. "Microstructure and Electrochemistry of Al-Rich Primer," SAE 2021 WCX Digital Summit (virtual), 4/13/21, **invited lecture.**

216. "Corrosion of Single Phase Compositionally Complex Alloys," MRS meeting (virtual), 12/20, **invited lecture.**

215. "Corrosion Protection of AA2024-T3 by Smart Coatings Responsive to Both Acidic and Alkaline Environments," SERDP&ESTCP Virtual meeting, 12/1/20, **invited lecture.**

214. "The Role of Salt Films in Pits," ECS Meeting (online), 10/20, **invited lecture.**

213. "A New Paradigm for Designing Corrosion Resistant Materials," Univ. Wisconsin Madison (virtually), 9/17/20, **invited lecture.**

212. "The Nature and Role of Salt Films in Pits," International Society of Electrochemistry meeting (online), 9/3/20, **invited lecture.**

211. "A New Paradigm for Designing Corrosion Resistant Materials," Univ. Alberta, 1/23/20, **invited award lecture.**

210. "Studies on the Corrosion of Al Alloys," Novelis Global Research & Technology Center, Kennisaw, GA, 2/20/20, **invited lecture.**

209 "A New Paradigm for Designing Corrosion Resistant Materials," IIT Bombay, 12/13/19, **invited lecture.**

208. "Corrosion of Single- and Multi-phase High Entropy Alloys," HEA Congress 2019, Seattle, 11/19/19.

207. "Design of Corrosion Resistant High Entropy Alloys," AVS meeting, Columbus, 10/24/19, **invited lecture.**

206. "Corrosion of Magnesium Thin Films," ECS Fall meeting, Atlanta, 10/15/19.

205. "A New Model for Pit Stability," ECS Fall meeting, Atlanta, 10/15/19.

204. "Corrosion Resistant High Entropy Alloys," Eurocorr 2019, Seville, Spain, 9/11/19.

203. "A New Model for Pit Stability," Eurocorr 2019, Seville, Spain, 9/10/19, **keynote lecture.**

202. “A New Paradigm for Designing Corrosion Resistant Materials,” Univ. North Texas, Denton, 5/28/19, **invited lecture**.

201. “Corrosion of Magnesium Thin Films,” Symposium on Past, Present and Future of Corrosion and Light Metal Surface Science in honor of Kemal Nisancioglu, NTNU, Trondheim, Norway, 5/24/19, **invited lecture**.

200. “Experimental Validation of New Model for Pit Stability Using One-Dimensional (1D) Artificial Pit Electrodes,” NACE Corrosion2019, Nashville, 3/25/19.

199. “A New Paradigm for Designing Corrosion Resistant Materials,” Univ. of Aukland, 12/13/18, **invited lecture**.

198. “Corrosion of Nuclear Waste Forms,” MRS meeting, Boston, 11/26/18, **invited lecture.**

197. “A Model for Critical Pitting Temperature (CPT),” ISE meeting, Bologna, 9/3/18, **keynote address.**

196. “A New Paradigm for Designing Corrosion Resistant Materials,” Xi’an Jiaotong Univ., Xi’an, 7/1/18, **invited lecture**.

195. “Corrosion and Protection of Magnesium,” Shanghai Jiaotong Univ., Shanghai, 6/23/18, **invited lecture**.

194. “A New Paradigm for Designing Corrosion Resistant Materials,” Institute for Corrosion and Multiphase Technology, Univ. Science and Tech. Beijing, 6/21/18, **invited lecture**.

193. “A New Paradigm for Designing Corrosion Resistant Materials,” Institute for Corrosion and Multiphase Technology, Ohio Univ., 6/1/18, **invited lecture**.

192. “Corrosion Resistant High Entropy Alloys,” NACE Corrosion2018, Phoenix, 4/16/18.

191. “A New Paradigm for Designing Corrosion Resistant Materials,” Local ECS Chapter meeting, Case Western Reserve Univ., 3/21/18, **invited lecture**.

190. “A New Paradigm for Designing Corrosion Resistant Materials,” Dept. of Chemical Engineering Seminar Series, Iowa State Univ., 2/8/18, **invited lecture**.

189. “Localized Corrosion Behavior of a Ni-Based High-Entropy Alloy,” ECS meeting, National Harbor, MD, 10/4/17.

188. “Atmospheric Pitting Corrosion Studies of AA7075-T6 Under Electrolyte Droplets,” ECS meeting, National Harbor, MD, 10/3/17.

187. “Localized Corrosion: Passive Film Breakdown vs. Pit Growth Stability,” NACE Corrosion2017, New Orleans, 3/28/17.

186. "Effects of Abrasion- and Deformation- Induced Altered Surface Layers on the Corrosion of Al Alloys," EuroCorr 2016, Montpellier, France, 9/12/16, **introductory plenary lecture.**

185. "Corrosion of High Strength Al Alloys," Kaiser Aluminum, Spokane, WA 7/28/16, **invited lecture**.

184. "Hydrogen Evolution on Dissolving Mg; Impurities, Films, and Active Surfaces," Gordon Research Conference presentation, New London, NH, 7/10/16, **invited lecture**.

183. "Effects of Abrasion- and Deformation- Induced Altered Surface Layers on the Corrosion of Al Alloys," IMR Materials Week, OSU, Columbus, 5/12/16, **invited lecture.**

182. "Dissolution of Mg and Hydrogen Evolution," Oak Ridge National Lab, 4/19/16, **invited lecture**.

181. "Localized Corrosion, a Review of the Critical Parameters," NACE Corrosion2016, Vancouver, 3/9/16, **invited lecture.**

180. "Corrosion of High Strength Al Alloys," Ford Research, Dearborn, 1/20/16, **invited lecture.**

179. "Altered Surface Layers and Inhibition of Corrosion and Cracking on Sensitized AA5083," Jinwook Seong, Gerald S. Frankel, and Narasi Sridhar, ECS Meeting, Phoenix, 10/12/15.

178. "Anodic Hydrogen Evolution (Negative Difference Effect) on Aluminum," B. Lynch, S. Fajardo, and G.S. Frankel, ECS Meeting, Phoenix, 10/13/15.

177. "Altered Surface Layers and Inhibition of Corrosion and Cracking on Sensitized AA5083," Jinwook Seong, G. S. Frankel, and Narasi Sridhar, ASST, Madeira, Portugal, 5/19/15.

176. "Microstructural Effects on the Localized Corrosion of Al Alloys," University of Akron, Department of Chemical Engineering seminar series, G.S. Frankel, 4/23/15, **invited lecture.**

175. "Chemistry of Localized Corrosion: Some Issues," G.S. Frankel, Faraday Discussions meeting on Corrosion Chemistry, London, 4/13/15, **introductory lecture.**

174. "Corrosion and Protection of Al Alloys," G.S. Frankel, NACE Corrosion2015, Dallas, 3/17/15, **Whitney Award lecture**.

173. "Degradation of Coatings and Coating Interfaces on Steel," G.S. Frankel, Severine Cambier, and Rolf Posner, 19th International Corrosion Congress, Jeju, Korea, 11/3/14, **introductory plenary lecture.**

172. "Mechanism of Hydrogen Evolution on Dissolving Mg Surfaces," G.S. Frankel, ElectrochemOhio, Columbus, 9/20/14, **invited lecture.**

171. "A Tribute to the SKP," G.S. Frankel, MPIE Alumni Meeting in Honor of M. Stratmann, Dusseldorf, 5/28/14, **invited lecture.**

170. "Mechanism of Hydrogen Evolution on Dissolving Mg Surfaces," G.S. Frankel, USTB, Beijing, 5/4/14.

169. "Mechanism of Hydrogen Evolution on Dissolving Mg Surfaces," G.S. Frankel, IMR, Shenyang, Lee Hsun Lecture Award, 5/4/14, **award lecture.**

168. "Dissolution Mechanisms of Mg and AA5083," A. Samaniego, B. Hurley, N. Birbilis, L. Rossrucker, J. Seong and G. S. Frankel, corrosion group seminar, KTH, Stockholm, 3/31/14.

167. "Mechanism of Hydrogen Evolution on Dissolving Mg Surfaces," A. Samaniego, B. Hurley, N. Birbilis and G. S. Frankel, Research Technical Symposium, NACE Corrosion14, San Antonio, 2/25/14, **invited lecture**.

166. "Mechanism of Hydrogen Evolution on Dissolving Mg Surfaces," A. Samaniego, B. Hurley, and G. S. Frankel, IMEC16, Haifa, Israel, 2/25/14, **keynote lecture**.

165. "Safe Storage of Radioactive Waste in the Hanford Waste Tanks," G.S. Frankel, Georgia Tech, Dept. of Materials Science seminar series, 11/11/13, **invited lecture.**

164. "Atmospheric Pitting Corrosion of AA7075-T6Under Evaporating Droplets," Sean C. Morton, Mark S. Thomson, and G. S. Frankel, ECS Meeting, San Francisco, 10/29/13.

163. "Effect of Vacuum System Base Pressure on Corrosion Resistance of Sputtered Al Thin Films," G.S. Frankel, X. Chen, R. Gupta, N. Birbilis, and S. Kandisamy, ECS Meeting, San Francisco, 10/30/13.

162. "Prevention of Corrosion and Cracking of Steel Tanks for High Level Radioactive Waste," G.S. Frankel, Dept. of Materials Engineering, Ben Gurion University of the Negev, Be'er Sheva, Israel, 5/9/13, **invited lecture.**

161. "Hydrogen Evolution on Dissolving Mg Surfaces," G.S. Frankel, N. Birbilis, A. Samaniego, NACE Corrosion 2013, 3/19/13.

160. "Prevention of Corrosion and Cracking of Steel Tanks for High Level Radioactive Waste," G.S. Frankel, Dept. of Materials Engineering, Technion, Haifa, Israel, 2/17/13, **invited lecture.**

159. "Prevention of Corrosion and Cracking of Steel Tanks for High Level Radioactive Waste," G.S. Frankel, separate meetings of the Newcastle, New South Wales, and Brisbane branches of the Australasian Corrosion Association, October 16, 24, and 25, 2012, **invited lectures.**

158. "The Role of Metallic Surface Pretreatment on Paint Adhesion and Corrosion Protection," G.S. Frankel, Henkel Corp., Madison Heights, MI, 6/19/12, **invited lecture.**

157. "Measurements of Adhesion and Adhesion Degradation for Organic Coatings on Metals," G.S. Frankel, ICAA-13, Pittsburgh, 6/4/12, **invited lecture.**

156. "Assessment of Coating Adhesion and Adhesion Degradation by AFM Scratching," B. Rincon-Troconis, J. Seong, N.W. Khun, G.S. Frankel, NACE Corrosion 2012, Research in Progress, Salt Lake City, 3/12/12.

155. "Organic Coatings on Metals: Assessments of Adhesion and Adhesion Degradation," G.S. Frankel, Case Western Reserve University, Materials Science and Engineering Departmental Seminar, 3/6/12, **invited lecture**.

154. "Carbon Steel Corrosion at the Liquid-Air Interface in Simulated Nuclear Waste Solutions," G.S. Frankel, Univ. of Western Ontario, Chemistry Dept. Seminar, 12/1/11, **invited lecture**.

153. "Corrosion Inhibition of Galvanized Steel by a Hybrid Organic/Inorganic Coating," K.N. Win, S. Adhikari, Y-Y. Li, G.S. Frankel, B. Bammel, T. Smith, J. McGee, J. Comoford, J. Zimmerman, G. Donaldson, Electrochemical Society Meeting, Boston 10/11/11.

152. "Carbon Steel Corrosion at the Liquid-Air Interface in Simulated Nuclear Waste Solutions," X. Li, and G.S. Frankel, Electrochemical Society Meeting, Boston 10/10/11.

151. "Localized Corrosion in Al Alloys," G.S. Frankel, Corrosion Science Symposium, Institute of Corrosion, at Electrochem 2011, Royal Society of Chemistry, Bath England, 9/5/11, **UR Evans Award address.**

150. "Study of Trivalent Chrome Process Treatment on AA2024-T3," Y. Guo and G.S. Frankel, DoD Corrosion Conference, La Quinta, CA, 8/2/11.

149. "Localized Corrosion of Al Alloys and Its Prevention," G.S. Frankel, United Technologies Fellows Seminar, United Technologies Research Center, 5/25/11, **invited lecture.**

148. "Contributions to the Understanding of Localized Corrosion of Passive Metals," G.S. Frankel, Annual Meeting of the Corrosion Science Society of Korea, Jeju, Korea, 4/28/11. **introductory plenary lecture.**

147. "Pitting Corrosion of Stainless Steel under Chloride Droplets," G.S. Frankel, POSCO, Pohang, Korea, 4/27/11.

146. "Prevention of Corrosion and Cracking of Steel Tanks for High Level Radioactive Defense Waste at the Hanford Site," G.S. Frankel, Graduate Institute for Ferrous Metallurgy, Postech, Pohang, Korea, 4/26/11.

145. "New Approaches for Measuring Adhesion and Adhesion Degradation," B.C. Rincon Troconis, S. Adhikari, J. Seong, G.S. Frankel, NACE Corrosion 2011, Houston, 3/15/11.

144. "Prevention of Corrosion and Cracking of Steel Tanks for High Level Radioactive Defense Waste at the Hanford Site," G. S. Frankel, Carnegie Mellon Univ., Materials Sci. and Eng. departmental seminar, 11/19/10 **invited lecture.**

143. "Chromate-Free and Phosphate-Free Surface Pretreatments," S. Adhikari and G.S. Frankel, MS&T Conference, Houston, 10/19/10.

142. "Liquid Air Interface Corrosion of Steel Tanks for High Level Radioactive Defense Waste," X. Li and G.S. Frankel, ECS Fall Meeting, Las Vegas, 10/12/10.

141. "Contributions to the Understanding of Localized Corrosion," G.S. Frankel, ECS Fall Meeting, Las Vegas, 10/12/10 **H.H. Uhlig Award Address.**

140. "Prevention of Corrosion and Cracking of Steel Tanks for High Level Radioactive Defense Waste at the Hanford Site," G. S. Frankel, ISE Annual Meeting, Nice, France, 9/28/10 **plenary lecture.**

139. "Localized Corrosion Under Droplets and Thin Electrolyte Layers," B. Maier, S. Taira, and G.S. Frankel, Australasian Corrosion Conference, Coffs Harbour, Australia, 11/16/09 **introductory keynote address.**

138. "Cr-Free and Phosphate-Free Surface Treatments for Steel and Al Alloys," B. Rincon Troconis, Y. Guo, K. Unocic, S. Adhikari and G. S. Frankel, ECS Fall Meeting, Vienna, 10/5/09.

137. "Effects of Cl-, UV, O3, and RH Atmospheric Corrosion of Ag," D. Liang, G.S. Frankel, C. Lemon, and H.C. Allen, NACE Corrosion2009, Atlanta, 3/24/09.

136. "The Future of Corrosion Education and the Effects on NACE International," G.S. Frankel, Corrosion2009, Atlanta, 3/23/09 **plenary address.**

135. "Hexafluorozirconic Acid Surface Treatments for Steel Substrates," Y. Zhai, G.S. Frankel, J. Zimmerman, W. Fristad, A. Seyeux, A. Galtayries, P. Marcus, Taiwan 2008 International Steel Technologies Symposium, Kaohsiung, Taiwan, 11/4/08, **invited talk.**

134. "Atmospheric Corrosion of Ag; Effects of Cl-, UV, O3, and RH," D. Liang, G.S. Frankel, Z. Chen, R.G. Kelly, G. Ma, H. Allen, Y. Wu, and B. Wyslouzil, ECS Fall Meeting, Honolulu, 10/15/08.

133. "Chromate-free Surface Treatments for Al Alloy and Steel Substrates," Y. Zhai, Y. Guo, G.S. Frankel, J. Zimmerman and W. Fristad, 17th International Corrosion Congress, Las Vegas, 10/08/08.

132. "Nanoscale Cr-free Conversion Coatings for Al Alloy and Steel Substrates," Y. Zhai, Y. Guo and G.S. Frankel, EMNT 2008, Ein Gedi, Israel, 9/18/08, **invited lecture.**

131. "Role of Ozone and UV Light in Atmospheric Corrosion of Ag," D. Liang and G.S. Frankel, EUROCORR 2008, Edinburgh, Scotland, 9/11/08, **plenary lecture.**

130. "Activities in the Fontana Corrosion Center," G.S. Frankel, Laboratory on Physical Chemistry of Surfaces, ENSCP, Paris, 7/7/2008.

129. "Activities in the Fontana Corrosion Center," G.S. Frankel, Laboratory on Interfaces and Electrochemical Systems, University of Pierre and Marie Curie, Paris 6, 7/1/2008.

128. "Role of Reactive Chloride Species in Atmospheric Corrosion of Ag," Dong Liang, G.S. Frankel, G. Ma, H. Allen, Y. Wu, B. Wyslouzil, Z. Chen, B. Keene, and J. Fuentes, NACE Corrosion2008, Research in Progress, New Orleans, 3/18/08.

127. "The Usefulness of Ultra-High Resolution Microstructural Studies for Understanding Localized Corrosion Behavior of Al Alloys," G.S. Frankel, M. Kappes, L. Kovarik, M.J. Mills, and M.K. Miller, Chalmers Univ., Gothenburg, Sweden 01/22/08.

126. "Effects of Stress on the Localized Corrosion Behavior of Al Alloys," X. Liu and G. S. Frankel, ECS Meeting, Washington, DC 10/9/07.

125. "The Usefulness of Ultra-High Resolution Microstructural Studies for Understanding Localized Corrosion Behavior of Al Alloys," G.S. Frankel, M. Kappes, L. Kovarik, and M.J. Mills, ECS Meeting, Washington, DC 10/11/07.

124. "Crevice Repassivation Potential for Alloy 22 in Different Environments," A.K. Mishra and G.S. Frankel, AS&T Conference, Detroit, 9/19/07.

123. "The Kelvin Probe: A Powerful Tool for Electrochemistry," G.S. Frankel, Sandia National Labs, Chemistry and Physics Colloquium, 7/11/07, **invited talk.**

122. "Effects of Surface Deformation from Polishing on Corrosion of Al Alloys," Z. Zhao, G. S. Frankel, Workshop on Cold Work in Iron- and Nickel-Base Alloys Exposed to High Temperature Water Environments, AECL and EPRI meeting, Toronto, 6/5/07.

121. "Electrochemical Techniques in Corrosion; Status, Limitations and Needs," G. S. Frankel, ASTM Symposium on Advances in Electrochemical Techniques for Corrosion Monitoring and Measurement, Norfolk, 5/22/07, **plenary lecture.**

120. "Corrosion Education: Materials Science," G.S. Frankel, Materials Forum 2007, Corrosion Education for the 21st Century, National Academies, National Materials Advisory Board meeting, Washington, 3/30/07, **invited talk**.

119. "Development of Ni-Cu Consumables for Welding of Austenitic Stainless Steels ," Dong Liang, G.S. Frankel, J. Sowards, B. Alexandrov, J.C. Lippold, NACE Corrosion2007, Research in Progress, Nashville, 3/12/07.

118. "Effect of Nano-Scale Segregation on Localized Corrosion of Al Alloys", G. S. Frankel and M. Kappes, Workshop on Future Perspectives in Corrosion Research, Ringberg Castle, Tegernsee, Germany, 12/15/06, **invited talk**.

117. "Inhibition of AA2024-T3 Corrosion by Vanadates," M. Iannuzzi and G. S. Frankel, ECS Meeting, Cancun, 11/1/06, **invited talk.**

116. "Atomic Force Microscopy, A Tool for Surface Characterization," G. S. Frankel, MS&T'06 conference, Cincinnati, 10/16/06, **invited talk.**

115. "Al Alloy Corrosion and Inhibition," G. S. Frankel, Univ. of Llubljana, Slovenia, 9/6/06, **invited talk.**

114. "On the First Breakdown Potential in AA7xxx Alloys," Z. Zhao and G.S. Frankel, Gordon Research Conference on Aqueous Corrosion, New London, NH, 7/17/06, **invited talk**.

113. "Inhibition of Al Alloy Corrosion by Vanadates," M. Iannuzzi and G. S. Frankel, Fourth Aluminum Surface Science and Technology Symposium, Beaune, France, 5/16/06.

112. "Effects of Compressive Stress on Intergranular Corrosion in AA2024-T3," X. Liu and G. G. S. Frankel, Fourth Aluminum Surface Science and Technology Symposium, Beaune, France, 5/18/06.

111. "Localized Corrosion," G. S. Frankel, Caterpillar Corp, Peoria, IL, 4/26/06, **invited talk.**

110. "Electrochemical Measurements on Stainless Steel using a Kelvin Probe Potentiostat," G. S. Frankel, North Dakota State Univ., Dept. of Coatings and Polymeric Materials Seminar, 4/24/06, **invited talk.**

109. "Measurement of Oxygen Reduction and Breakdown Potentials on Stainless Steel using a Kelvin Probe," G.S. Frankel, B. Maier, M. Stratmann, A. Michalik, G. Paliwoda, and M. Wicinski, Research in Progress symposium NACE2006, San Diego, 3/15/06, **invited talk.**

108. "Localized Corrosion Growth Rates in AA7xxx Alloys," Tsai-Shang Huang, Xinyan Zhao, and G.S. Frankel, Army Corrosion Summit, Clearwater Beach, 2/16/06, **Invited Talk.**

107. "Activities in the Fontana Corrosion Center," G.S. Frankel, Colloquium, Ohio University, Athens, OH, 12/6/05. **Invited Talk.**

106. "Localized Corrosion Growth Rates in AA7xxx," Tsai-Shang Huang, Xinyan Zhao, and G.S. Frankel, Tri-Service Corrosion Conference, Orlando, 11/17/05.

105. "Effect of Stress on Localized Corrosion in Al Alloys," Xiaodong Liu, Zhijun Zhao, G. S. Frankel, B. Zoofan and S. I. Rokhlin, Tri-Service Corrosion Conference, Orlando, 11/14/05.

104. "Corrosion Protection of AA2024-T3 by Metavanadates and Vanadium-Based Conversion Coatings," M. Iannuzzi, G.S. Frankel, and R.G. Buchheit, ECS Meeting, Los Angeles, 10/18/05.

103. "Corrosion Reliability Prediction: Long Term Nuclear Waste Storage in Yucca Mountain," G. S. Frankel, 16th International Corrosion Congress, Beijing, 9/19/05. **Plenary Address.**

102. "Corrosion Curriculum at the Fontana Corrosion Center," 16th International Corrosion Congress, Beijing, 9/19/05. **Invited Talk.**

101. "Effect of Tensile and Compressive Stress on IGC and IGSCC in AA2024-T3", Xiaodong Liu, G. S. Frankel, B. Zoofan and S. I. Rokhlin, International Symposium on Progress in Corrosion Research in Commemoration of Centenary of Birth of Professor Go Okamoto, Sapporo, Japan, 9/15/05, **Invited talk.**

100. "Growth Kinetics of Intergranular and Exfoliation Corrosion in AA7xxx," Tsai-Shang Huang, Xinyan Zhao, and G. S. Frankel, Passivity-9, Paris, 6/30/05. **Keynote address.**

99. "In Situ AFM Scratching of High Strength Al Alloys," M. Iannuzzi, P. Schmutz, V. Gillaumin, P. Leblanc, and G.S. Frankel, AGEF Seminar on Tribocorrosion, Duesseldorf, 4/19/05. **Invited talk**.

98. "Hydrogen Embrittlement Resistance of Inconel Alloy MA754," N. Gingo, Z. Sun, G.S. Frankel, and D. Hardwick, Research in Progress Symposium, NACE Corrosion05, Houston, 4/4/05.

97. "Toward US-China Collaboration in Education and Academic Research," G.S. Frankel, NACE International Corrosion05, Houston, 4/4/05. **Invited talk**.

96. "Long Term Nuclear Waste Storage – The Most Important Materials Problem of Our Time," G.S. Frankel, Dept. of Materials Science and Eng. Colloquium, Ruhr-University Bochem, 4/1/05, **Invited talk**.

95. "Outlook for Corrosion Science," G. S. Frankel, Workshop on New Trends and Methods in Corrosion Research and Electrochemistry @ EMPA, Dubendorf, Switzerland, 2/15/05. **Invited talk**.

94. "Studies of Organic Coatings on Metals using Electrochemical Quartz Crystal Microbalance and Potential Pulse Testing," J. Kang and G. S. Frankel, Workshop on Applied Surface and Interface Analysis for Thin Film Coated Metals, Duesseldorf, 12/2/04. **Invited talk**.

93. "Imaging and Characterization of Multiple Stress Corrosion Cracks in AA2024-T3 by X-ray Radiography," Xiaodong Liu, G. S. Frankel, B. Zoofan and S. I. Rokhlin, ECS Meeting, Honolulu, HI, 10/4/04.

92. "Activities in the Fontana Corrosion Center," G. S. Frankel, Institute for Metal Research, Shenyang, China, 8/23/04.

91. "Novel Approach for Welding Stainless Steel Using Cr-Free Welding Consumables," Y. H. Kim, G. S. Frankel, G. Guaytima and J. C. Lippold, NACE Corrosion2004, New Orleans, 3/31/04.

90. "Novel Approach for Welding Stainless Steel Using Cr-Free Welding Consumables," Y. H. Kim, G. S. Frankel, G. Guaytima and J. C. Lippold, Army Corrosion Summit, Cocoa Beach, FL, 2/12/04.

89. "Growth Kinetics of Intergranular and Exfoliation Corrosion in AA7178," Tsai-Shang Huang, Xinyan Zhao, G. S. Frankel, B. Zoofan and S. I. Rokhlin, Triservice Corrosion Conference, Las Vegas, 11/20/03.

88. "Effect of Stress on Localized Corrosion in Al Alloys," Xiaodong Liu, Zhijun Zhao, G. S. Frankel, B. Zoofan and S. I. Rokhlin, Triservice Corrosion Conference, Las Vegas, 11/18/03.

87. "Characterization of the Region around MnS Inclusions in Stainless Steel," Qingjiang Meng, G.S. Frankel, H. Colijn, S. Goss, ECS Meeting, Orlando, 10/15/03.

86. "Inhibition of Al and Al Alloy Corrosion by Chromates," G. S. Frankel and R. L. McCreery, Michal Smialowski International Symposium on Corrosion and Hydrogen Degradation, Zakopane, Poland, 9/10/03, **Invited Talk.**

85. "Corrosion Science in the 21st Century," G. S. Frankel, International Symposium, Corrosion Science in the 21st Century, UMIST, Manchester, England, 7/7/03. **Introductory Plenary Address.**

84. "A New Method for Quantification of Exfoliation Rates and Assessment of Exfoliation Susceptibility," X. Zhao and G. S. Frankel, International Symposium, Corrosion Science in the 21st Century, UMIST, Manchester, England, 7/10/03.

83. "Application of Scanning Kelvin Probe Force Microscopy for Studies of Corrosion," G. S. Frankel, Seminar, Max Planck Institut fuer Eisenforschung, Duesseldorf, 5/5/03. **Invited Talk.**

82. "Effect of Cu Content on Corrosion Behavior and Chromate Protection of 7xxx Series Al Alloys," Q. Meng and G. S. Frankel, ECS Meeting, Paris, 4/30/03.

81. "Scanning Kelvin Probe Force Microscopy Studies of Corrosion," G. S. Frankel, MSE Colloquium, Johns Hopkins University, 4/9/03. **Invited Talk.**

80. “Electrochemical Quartz Crystal Microbalance Study on Au and Phases in AA2024-T3,” G. S. Frankel, J. Kang, and Y. Baek, NACE Corrosion2003, San Diego, 3/18/03.

79. “A New Test for Exfoliation Susceptibility and Kinetics: Exfoliation of Slices in Humidity,” X. Zhao, T. Huang and G. S. Frankel, Research in Progress, NACE Corrosion2003, San Diego, 1/17/03.

78. “Potentiostatic Pulse Testing for Assessment of Early Coating Failure,” J. Kang and G. S. Frankel, Army Corrosion Summit, Clearwater, FL, 2/13/03.

77. "Characterization of Corrosion and Corrosion Susceptibility of Metallic Surfaces by Scanning Kelvin Probe Force Microscopy," P. Leblanc and G. S. Frankel, Meeting of the Japanese Institute of Iron and Steel, Osaka, 11/3/02. **Invited talk.**

76. "Intergranular Corrosion Morphology and Growth Kinetics in High Strength Al Alloys," T.-S. Huang, X. Liu, X. Zhao, and G. S. Frankel, ECS Meeting, Salt Lake City, 10/21/02.

75. "Scanning Kelvin Probe Force Microscopy Studies of Corrosion," G. S. Frankel, MSE Colloquium, Lehigh University, 10/17/02. **Invited Talk.**

74. "Peer Review Panel Assessment of the Planned Waste Package Materials for Disposal of High Level Nuclear Waste at Yucca Mountain," G. S. Frankel, J. H. Payer, J. A. Beavers, T. M. Devine, Jr, R. H. Jones, R. G. Kelly, R. M. Latanision, TMS Annual Meeting, Columbus, OH, 10/7/02.

73. "Wagner-Traud To Stern-Geary; Development of Corrosion Kinetics," G. S. Frankel, ECS Meeting, Philadelphia, 5/13/02.

72. "Sulfide Stress Cracking Resistance of Welded High-Strength Low-Alloy Pipeline Steels," G. Omweg, G. S. Frankel, W. Bruce, J. Ramirez, G. Koch, NACE Corrosion 2002, Denver, 4/10/02.

71. “Intergranular Corrosion Growth Kinetics in High Strength Al Alloys,” G. S. Frankel, Army Corrosion Summit, St. Petersburg, 3/6/02.

70. "Localized Corrosion Growth Kinetics in Al Alloys," G. S. Frankel, 2002 Triservice Corrosion Conference, San Antonio, 1/18/02.

69. "Inhibition of Al Alloy Corrosion by Chromate," G. S. Frankel, 2002 Triservice Corrosion Conference, San Antonio, 1/18/02.

68. ”Localized Corrosion of Al Alloys," G. S. Frankel, Rockwell Science Center Seminar, 12/7/01.

67. "Studies of Corrosion using Scanning Kelvin Probe Force Microscopy," G. S. Frankel, 12th Asia-Pacific Corrosion Control Conference 2001, Seoul, Korea, 10/10/01, **Plenary Lecture.**

66. "Scanning Kelvin Probe Force Microscopy and AFM Scratching Studies of Corrosion," G. S. Frankel, Departmental Colloquium Series, MSE, OSU, 5/18/01.

65. "Intergranular Corrosion and Stress Corrosion Cracking of AA2024-T3," X. Liu, W. Zhang, and G. S. Frankel, NACE2001 Research Technical Symposium, Houston, 3/13/01, I**nvited Talk**.
64. "Effect of Stress on Penetration of Intergranular Corrosion in Aluminum Alloys; Transition of IGC to IGSCC," X. Liu, W. Zhang, and G. S. Frankel, TMS Conference, New Orleans, 2/15/01.

63. "Open Circuit Pit Growth in Al," D. Lu and G. Frankel. ECS Meeting, Phoenix, 10/26/00.

62. "Scanning Kelvin Probe Force Microscopy Studies of Corrosion," P. Schmutz, V. Guillaumin, D. Devecchio, G. S. Frankel, ACS Meeting, Washington, DC, 8/23/00, **Invited Talk.**

61. "Activities in the Fontana Corrosion Center," G. S. Frankel, Luoyang Ship Materials Research Institute, Qingdao, 8/4/00, Institute for Corrosion and Protection of Materials, Shenyang, 8/8/00, Corrosion and Protection Centre, University of Science and Technology Beijing, 8/10/00. **Invited Talk.**

60. "Assessment of Localized Corrosion Kinetics in Aluminum Alloys," G. S. Frankel, Univ. of Cincinnati, Dept of Materials Science Seminar, 6/2/00.

59. "Scanning Kelvin Probe Force Microscopy Studies of Passive Surfaces," P. Schmutz, V. Guillaumin, and G. S. Frankel, MRS Meeting, San Francisco, 4/00. **Invited Talk.**

58. "Role of Microstructure and Grain Boundary Constituents on Pitting and Intergranular Corrosion of Aluminum Alloys," T. Ramgopal, W. Zhang, and G. S. Frankel, NACE Corrosion2000, Orlando, 3/00.

57. "A New Approach for the Study of Chemical Mechanical Polishing," D. Devecchio, P. Schmutz, and G. S. Frankel, 1999 ECS Fall Meeting, Honolulu, 10/21/99.

56. "Intergranular Corrosion of High Strength Al Alloys", W. Zhang, T. Ramgopal, and G. S. Frankel, Triservice Corrosion Conference, Myrtle Beach, 11/17/99.
55. "Localized Corrosion of Metals: A Review of the Critical Factors in Initiation and Growth," G. S. Frankel, Passivity-8, Jasper, Canada, 5/99, **Keynote address.**

54. "Study of Localized Corrosion of Al and Al Alloys by AFM Scratching," P. Schmutz and G. S. Frankel, Research in Progress Symposium, NACE Corrosion99, San Antonio, 4/26/99. **Invited Talk.**

53. “The Susceptibility of Conventional ASTM A516-70 to HIC and SOHIC in H_2S-Containing DGA Environments,” M. Al-Anezi, G. S. Frankel, and A. Agrawal, NACE Corrosion99, San Antonio, 4/26/99.

52. "Corrosion of Aging Aircraft and Corrosion-Sensing Paint", G. S. Frankel, McMaster Univ., Hamilton, Ontario, 3/12/99.

51. “Mechanism of Al Alloy Corrosion and the Role of Chromate Inhibitors”, G. S. Frankel, Cleveland section meeting of The Electrochemical Society, 12/9/98.

50. "Corrosion Sensing Coating Systems," J. Zhang and G. S. Frankel, ECS Fall Meeting, Boston, 11/98.

49. "Corrosion of Electronic and Magnetic Materials and Devices," G. S. Frankel, ASM Annual Meeting, Rosemont, IL, 10/13/98.

48. “Mechanism of Al Alloy Corrosion and the Role of Chromate Inhibitors”, G. S. Frankel, AFOSR/DARPA review meeting, 9/28/98.

47. “Effects Of Inhibitor Ions On The Growth Of Pits In Thin Film Aluminum”, G. S. Frankel, AFOSR/DARPA review meeting, 9/28/98.

46. “Effects of Chromate Ions on Localized Corrosion of Al and Al Alloys,” G. S. Frankel, P. Schmutz, E. Akiyama, W. Zhang, D. Lu, and A. Sehgal, AFRL Workshop on Advanced Metal Finishing Techniques for Aerospace Applications, Keystone, CO, 8/27/98, **Invited Talk**.

45. “Scanning Kelvin Probe Force Microscopy”, G. S. Frankel, Aqueous Corrosion Gordon Conference, New London, NH, 7/7/98, **Invited Talk**.

44. “Exfoliation and Intergranular Corrosion of Al Alloys”, T. Ramgopal, and G. S. Frankel, Aeromat 98, Tysons Corner, VA, 6/18/98.

43. “Effects of Chromate Ions on Pitting of AA1100-0 and AA2024-T3,” P. Schmutz, A. Sehgal, and G. S. Frankel, ECS Spring Meeting, San Diego, 5/98.

42. “Novel Applications of Scanning Probe Microscopy to the Study of Localized Corrosion,” G. Frankel, Penn State University Department of Engineering Science and Mechanics Colloquium, 4/8/98, **Invited Talk**.

41. “Localized Corrosion and Stress Corrosion Cracking Susceptibility of Friction Stir Welded AA 5454,” Z. Xia and G. S. Frankel, Research in Progress Symposium, NACE Corrosion 98, San Diego, 3/98, **Invited Talk**.

40. “Characterization of AA 2424-T3 by Scanning Kelvin Probe Force Microscopy,” P. Schmutz and G. S. Frankel, Research in Progress Symposium, NACE Corrosion 98, San Diego, 3/98.

39. "Mechanism of Al Alloy Corrosion and the Role of Chromate Inhibitors", G. S. Frankel, Special Seminar, MIT, 12/1/97.

38. "Paint as a Corrosion Sensor, A comparison of the sensitivity of different coating systems", J. Zhang and G. S. Frankel, Tri-Service Corrosion Conference, Wrightsville Beach, NC, 11/18/97.

37. "Paint as a Corrosion Sensor; Acrylic Coating Systems", J. Zhang and G. S. Frankel, MRS Meeting, Boston, 12/1/97.

36. "Mechanism of Al Alloy Corrosion and the Role of Chromate Inhibitors", G. S. Frankel, Central Michigan ECS Local Section Meeting, Midland Michigan, 10/29/97.

35. "Corrosion: A Tutorial with a Focus on Coatings and Inhibitors", Special Seminar, G. S. Frankel, Dow Corp, Midland Mich., 10/29/97.

34. "Paint as a Corrosion Sensor", J. Zhang and G. S. Frankel, 3rd Workshop on Quantitative Methods for Predicting Coating Performance, Naval Surface Warfare Center, Carderock, MD, 10/20/97, **Invited Talk.**

33. "A Study of Pit Growth in Al Thin Films", D. Lu, A. Sehgal, and G. S. Frankel, Fall ECS Meeting, Paris, 9/97, **Invited Talk.**

32. "Studies of Pitting Corrosion of Al and Al Alloys", P. Schmutz, J. Zhang, and G. S. Frankel, Swiss Federal Technical Institute, Zurich, Switzerland, 8/26/97.

31. Studies of Pitting Corrosion of Al and Al Alloys", P. Schmutz, J. Zhang, and G. S. Frankel, Ecole Polytechnique, Lausanne, Switzerland, 8/22/97.

30. "Pitting Corrosion: A Review of the Critical Factors", G. S. Frankel, Spring ECS Meeting, Montreal, 5/97, **Keynote Talk.**

29. "Paint as a Corrosion Sensor", G. S. Frankel and J. Zhang, Corrosion 97, New Orleans 3/11/97, **Invited Talk.**

28. "Corrosion of Electronic And Magnetic Devices And Materials," G.S. Frankel, MRS Fall Meeting, Boston, 12/2/96. **Invited Talk.**

27. "Effects Of Inhibitor Ions On The Growth Of Pits In Thin Film Aluminum," D. Lu, A. Sehgal, G.S. Frankel, Fall ECS Meeting, San Antonio, 10/10/95, **Invited Talk.**

26. "Corrosion of Electronic and Magnetic Materials; Future Problems and Challenges," G.S. Frankel, Gordon Conference on Aqueous Corrosion, New London, NH, 7/9/96, **Invited Talk.**

25. "Corrosion and Deuterium Uptake in Zr Alloy CANDU Pressure Tubes - A Critical Assessment," G.S. Frankel, AECB and Ontario-Hydro, Toronto, 6/27/96.

24. "Corrosion, A Tutorial with a Focus on Magnetic Materials," G. S. Frankel, Read-Rite Corp., Fremont, CA, 6/19/96.

23. "Corrosion, A Tutorial with a Focus on Magnetic Storage," G. S. Frankel, Hoya USA, San Jose, CA, 4/9/95.

22. "Corrosion Studies Of Magnetic Storage Devices," G.S. Frankel, MRS Spring Meeting, San Francisco, 4/8/96. **Invited Talk.**

21. "Corrosion, A Tutorial with a Focus on Electronic and Magnetic Materials," G. S. Frankel, 3M Technical Forum, Austin, 3/28/96.

20. "Corrosion - It's the Pits," G.S. Frankel, CMR Lunchtime Seminar Series, The Ohio State University, 1/18/96

19. "Corrosion of Thin Metallic Films in Computer Applications," G. S. Frankel, ECS Columbus Section Meeting, Battelle, 10/27/95.

18. "Corrosion, A Tutorial with a Focus on Magnetic Storage," G. S. Frankel, HMT Technology Corp., Fremont, 10/20/95.

17. "Repassivation of Pits in Al Thin Films," G. S. Frankel, J. R. Scully, and C. V. Jahnes, Fall ECS Meeting, Chicago, 10/9/95. **Invited Talk.**

16. "Corrosion of Thin Metallic Films," G. S. Frankel, Materials Science and Engineering Departmental Colloquium, University of Virginia, Charlottesville, VA, 4/3/95. **Invited Talk.**

15. "Corrosion and Adhesion of Multilayer Pad Structures for Packaging Applications," G. S. Frankel, S. Puroshothaman, T. A. Petersen, S. Farooq, S. N. Reddy, V. Brusic Electrochemical Society Meeting, Miami Beach, 10/12/94. **Invited Talk.**

14. "Repassivation Transients Measured with the Breaking Electrode Technique on Aluminum Thin-Film Samples," G.S. Frankel, C. V. Jahnes, V. Brusic, A. J. Davenport, Electrochemical Society Meeting, Miami Beach, 10/12/94.

13. "Studies of Pitting Corrosion in Thin Metallic Films," G. S. Frankel, Gordon Research Conference, 7/12/94. **Invited Talk.**

12. "Periodic Passivation of CuP Anodes during Electrodeposition of Cu from Acid-Sulfate Electrolyte," G. S. Frankel, J. O. Dukovic, J. Horkans, Electrochemical Society Meeting, New Orleans, 10/13/93.

11. "On the Pitting Resistance of Sputtered Al Alloys," G. S. Frankel, R. C. Newman,C. V. Jahnes, M. A. Russak, Electrochemical Society Meeting, Honolulu, 5/19/93.

10. "Studies of Pitting Corrosion in Thin Metallic Films," G. S. Frankel, National Institute of Standard & Technology, Gaithersburg, 1/13/93.

9. "Behavior of CuP Anodes under Electrodeposition Conditions," G. S. Frankel, A. G. Schrott, H. S. Isaacs, J. Horkans, P. C. Andricacos, Electrochemical Society Meeting, Toronto, 10/13/92.

8. "Pit Growth in NiFe Thin Films," G. S. Frankel, J. O. Dukovic, B. M. Rush, V. A. Brusic, and C. V. Jahnes, Electrochemical Society Meeting, Phoenix, 10/13/91.

7. "Experimental Techniques in Corrosion Science and Technology," G. S. Frankel, ASM International Electronic Materials and Processing Congress (4th), Montreal, Canada, 8/19/91.

6. "Passivation and Pitting of Sputtered Al Binary Alloys," G. S. Frankel, C. V. Jahnes, M. A. Russak, M. Mirzamaani, B. M. Rush, A. J. Davenport, H. S. Isaacs, Meeting of ONR-sponsored Contractors Studying Al Corrosion, Baltimore, 6/20/90.

5. "Corrosion Studies of Thin Films," G. S. Frankel, B. M. Rush, V. A. Brusic, S. M. Mirzamaani, and A. J. Davenport, Electrochemical Society Meeting, Seattle, WA, 10/14/90.

4. "Pitting of Aluminum and Aluminum Alloy Thin Films," G. S. Frankel, M. A. Russak, M. Mirzamaani, V. Brusic, C. Jahnes, Corrosion 89, New Orleans, 4/17/89.

3. "Pit Stability in Stainless Steels: The Transition from Metastability ," G. S. Frankel, International Conference on Localized Corrosion, Orlando, 6/4/87.

2. "Metastable Pitting of Stainless Steel," G. S. Frankel, L. Stockert, F. Hunkeler , H. Bohni, Corrosion 86, San Francisco, 3/11/86.

1. "Dislocation Transport of Hydrogen in Poly- and Single Crystal Ni," G. S. Frankel, and R. M. Latanision, MRS Fall Meeting, Boston, 12/1/84.

Sponsored Research

1. AFOSR
   The Influence of Inhibitor Ions and Conversion Coatings on Localized Corrosion of Al and Al Alloys
   RF 732039
   G. S. Frankel
   2/15/1996 - 02/14/1999
   $573,011, includes $140,000 from WPAFB to support work on *Paint as a Corrosion Sensor*

2. IBM

Electrochemical Impedance Spectroscopy Study of Polymer/Metal Composite Paste Materials
RF 732664
G. S. Frankel
10/1/95 - 9/28/97
$62,955, plus $18,333 OSU seed grant

3. Edison Welding Institute
   Corrosion and Stress Corrosion Cracking Resistance of Al Alloy Friction Stir Welds
   RF 732563
   G.S. Frankel
   7/1/96- 6/30/97
   $25,000, plus $15,000 matching funds from WPAFB

4. Department of Defense, MURI
   Mechanism of Al alloy corrosion and the role of chromate inhibitors
   RF 732915
   G. S. Frankel, lead PI, with 6 co PIs from various organizations: R. L. McCreery, C. Clayton, R. Granata, H. S. Isaacs, M. Kendig, M. Stratmann
   9/30/1996 - 9/29/2001
   $5,000,000, $2.6M subcontracted to other institutions

5. WPAFB, subcontract through TMC
   Exfoliation Corrosion of Al Alloys
   RF 733543
   G. S. Frankel
   1/20/97 - 11/19/99.
   $215,000, plus $3,000 in matching funds from OSU

6. AFOSR
   Measurement of localized corrosion propagation rates in Al and Al alloys
   G. S. Frankel
   RF 737103
   2/15/1999 - 11/14/2001
   $463,744

7. SERDP
   Critical Factors for the Transition from Chromate to Chromate-Free Corrosion Protection
   RF 737176
   R. G. Buchheit, lead PI, G. S. Frankel, R. L. McCreery, M. Donley, J. Beatty
   2/99 - 2/03
   $2,062,885 total, ~$200,000 for GSF

8. OSU Office of Research, Biomaterials Seed Grant
   Electrochemical Impedance Assessment of Titanium Implant Alloys Based on Cell Coverage
   G.S. Frankel and P. Monaghan
   5/99-5/01

$30,000

9. Edison Welding Institute
   SSC of welded high strength pipeline steels in sour environments
   RF 737923
   7/01/1999 - 6/30/2001
   $110,000

10. Department of Defense, MURI, Subcontract through UDRI
    NDE of Corrosion
    RF 739176
    G. S. Frankel and S. Rokhlin
    1/1/00 - 8/31/01
    $257,100 ($153,304 for GSF)

11. US Army, subcontracted through CTC
    Corrosion Control and Assessment Methods for US Army Assets
    R. G. Buchheit, Lead PI, G. S. Frankel, S. Lemeshow
    RF 740877, 740878, 740879
    4/1/2001 - 12/31/01
    $304,338, split evenly
    RF 742940
    1/1/2002-12/31/2002
    $178,000, $140,500 for GSF
    RF 746127, 746128
    4/1/3004-8/31/2004
    $175,000, $85,000 for GSF
    RF 60002244, 60002245
    9/1/2004-6/30/2005
    $100,000, $50,000 for GSF
    RF 60004431, 60005699
    5/23/05 - 3/30/06
    $40,000, $20,000 for GSF

12. Air Force Research Labs, subcontracted through NCI
    Intergranular and Exfoliation Corrosion Rate Studies
    RF 741467
    G. S. Frankel and S. Rokhlin
    7/11/2001-7/10/2002
    $100,000, $75,000 for GSF

13. DOE SBIR, subcontract through Omega International Technologies
    High resolution imaging system for corrosion measurement
    RF 741895
    G. S. Frankel
    9/30/2001-03/31/2002
    $15,000

14. AFOSR
Effects of Stress on Localized Corrosion in Al and Al alloys
RF 7422142 and 742820
G. S. Frankel and S. Rokhlin
3/1/2002 - 12/31/2004
$624,563, $469,616 for GSF

15. Air Force, subcontracted through SKT
Intergranular and Exfoliation Corrosion Rate Studies
G. S. Frankel and S. Rokhlin
RF 742940
1/1/2002-12/31/2002
$178,000, $140,500 for GSF
RF 744162
1/1/2003-3/31/2004
$178,778, $135,000 for GSF
RF 746516
4/1/2004-12/31/2005
$175,000, $149,000 for GSF

16. AFOSR
Mechanism and Inhibition of Oxygen Reduction
RF 742142
R. L. McCreery and G. S. Frankel
7/1/2002-12/31/2005
$446,933, split evenly

17. SERDP
Novel Approach for Welding Stainless Steel Using Cr-free Consumables
G. S. Frankel and J. Lippold
RF 743970, 746136, 746136, 746137
1/1/03-12/31/04
$200,000, $130,000 for GSF

Development of Cr-free Welding Consumables for Stainless Steels
G. S. Frankel and J. Lippold
RF 60004779, 60003312, 60000801
1/1/2005 – 9/30/2008
$1,238,055, ~$450,000 for GSF

18. NATO Travel Grant
Study of corrosion processes on aluminium alloys by means of electrochemical noise
RF 744221
G. S. Frankel and R. G. Buchheit
1/1/03-12/31/04
$10,244, split evenly

19. John Glenn Research Center - Lewis Field
    Intelligent Propulsion System Foundation Technology, Hot Corrosion
    R. A. Rapp and G. S. Frankel
    RF 745584
    9/1/03-8/31/04
    $98,750, split evenly

20. Air Force Materiel Command
    Development of a methodology for hydrogen embrittlement resistance
    G. S. Frankel, H. L. Fraser
    RF 746119
    1/1/04-8/31/05
    $130,000, all for GSF

21. DOE, subcontracted through Case Western Reserve Univ.
    Corrosion and Materials Performance Studies
    G. S. Frankel and R. G. Buchheit
    RF 747099
    7/1/2004-5/31/2004
    $1,302,500, split evenly

22. AFOSR, subcontracted through North Dakota State Univ.
    Effects of Stress on Localized Corrosion in Al and Al Alloys
    G. S. Frankel and S. I. Rokhlin
    RF 60001605, 60003249
    10/1/2004 – 10/1/2006
    $200,000, $150,000 for GSF

23. AFOSR, subcontracted through North Dakota State Univ.
    Localized Corrosion of High Strength Al Alloys
    G. S. Frankel
    RF 60004033
    10/1/2004 – 10/1/2006
    $214,954

24. Henkel Corp.
    Bonderite NT-1 Study
    RF 60006118, 60025694
    1/01/2006 - 2/28/2012
    $475k

25. US Council for Automotive Research, through Robert C. McCune and Assoc.
    Corrosion resistance assessment of pre-treated magnesium alloys by electrochemical methods
    G. S. Frankel
    RF 60012657, 60018412

6/1/2007 – 5/31/2008, 10/1/08-09/30/09
$100,000

26. Office of Sec. Defense through Mandaree Enterprise Corp.
Causes of Discrepancies between Field and Laboratory Corrosion Tests
G.S. Frankel and H.C. Allen
RF 60013168
7/1/2007 – 6/30/2008
$40,000, split evenly

27. SERDP
Scientific understanding of non-chromated corrosion inhibitors function
G. Frankel, R. Buchheit, G. Swain (Michigan State), and M. Jawarowski (United Tech.)
RF 60012546, 60015889, 60015890
3/24/2008 - 3/23/2012
$2.648M total, $1.649M for OSU, ~$825k for GSF

28. Office of Sec. Defense through Mandaree Enterprise Corp.
Collaborative university research on corrosion
G. Frankel, R. Buchheit, H. Allen (Chemistry)
RF 60016989, 60017793, 60017794
1/01/2008 - 5/15/2012
$1,175,000 total, $575k for GSF

29. Office of Sec. Defense through US Army Research Development and Engineering Command
Degradation of Polymer Coated Metals
G. Frankel, R. Buchheit, H. Allen (Chemistry)
RF 60020965, 60020970, 60020971
7/16/2009 - 7/15/2013
$1,000,000 total, $456k for GSF

30. Pohang Steel Corp.
The effects of inclusions on the corrosion of 21Cr ferritic stainless steels
RF 60024197
11/1/2009 – 10/31/2010
$50,000

31. Office of Naval Research
An assessment of science and technology for supporting advances in marine service coatings for the U.S. Navy
R. Buchheit and G. Frankel
RF 60025445
5/1/2010 – 4/30/2011
$100,000 total, $35k for GSF

32. Air Force Academy
Corrosion models and mechanistics to support assessment and prognostic tools for

managing corrosion of DOD facilities and equipment
RF 60025445
R. Buchheit and G. Frankel
RF 60027139
3/24/2010 – 3/23/2015
$2,000,000 total, $863k for GSF

33. DNV Columbus
Studies of nuclear waste tank corrosion at the liquid/air interface
RF 60026649
03/01/2010 - 12/31/2010
$32,000

34. US Dept. Of Energy
Fundamental study of micro-defects in electropolished EB-welded and hydroformed SRF accelerating structures
RF 60020182
06/15/2010 – 06/14/2013
$600,000 total, $257,000 for GSF

35. Ohio University
Application of FIB / TEM / EDS in CO2/H2S corrosion research
RF 60027145
09/01/2010 – 08/31/2011
$25,000 total

36. GE Aircraft Engines
Hot corrosion resistance of advanced turbine disk alloys and coatings
RF 60030464
01/01/2011 – 12/31/2011
$80,000
RF 60035692
01/01/2012 – 12/31/2012
$80,000 total

37. Boeing Co.
Structural and compositional characterization of surface treatments on Al alloys and of the metal/paint interface
RF 60031170
06/21/2011 – 12/31/2011
$38,902

38. POSCO
The effects of inclusions on the corrosion of austenitic stainless steels
RF 60032584
02/01/2012 – 12/31/2012
$59,158

39. US Automotive Material Partnership
    RF 60031164
    *Mg galvanic corrosion and protection*RF 60032584
    09/01/2012 - 08/31/2015
    $170,763

40. US Air Force Academy
    RF 60035036
    Corrosion models and mechanistics to support assessment and prognostic tools for managing corrosion of DOD facilities and equipment
    10/01/2011 - 09/30/2015
    $633,679

41. Office of Naval Research
    Corrosion degradation of coated Al alloy systems through galvanic interactions
    RF 60039812
    09/01/2013 - 08/31/2016
    $ 225,408

42. US Air Force Academy
    Study of Al Alloy Sacrificial Coating Pigment Particles
    RF 60041946
    10/01/2013 - 09/30/2017
    $500,000

43. BP through DNVGL
    Galvanic effects for localized corrosion of steel in the presence of CO2/H2S and inhibitors
    RF 60043721
    12/15/2013 - 12/31/2016
    $363,164

44. AFRL through UES
    Predictive Model for Corrosion of Al alloys
    RF 60049389
    04/1/2015 - 06/30/2016
    $75,000

45. Ford Motor Co
    Microstructure, modeling and real-word performance of mixed-material joints
    RF 60053462
    01/01/2016 - 03/06/2018
    $178,928

46. ALLMII/LIFT
    An integrated database and computational models for corrosion-resistant microstructural design

RF 60054229
02/01/2016 - 01/31/2018
$701,000 total, $350,000 for GSF

47. DOE
Center for Performance and Design of Nuclear Waste Forms and Containers (WastePD)
RF 60054745
08/01/2016 - 07/31/2017, will be renewed for 3 more years
$856,169 total, $160,000 for GSF

48. ONR
Development of a damage function for galvanic corrosion degradation of coated al alloy systems
RF 60058208
01/01/2017 - 12/31/2017, will be renewed for 3 more years
$90,478

49. DOE through PPG
Corrosion Control in CFRP Composite-Aluminum Closure Panel Hem Joints
RF 60058300
02/01/2017 - 01/31/2020
$760,000 total, $380,000 for GSF

Development Gifts

1. Det Norske Veritas (DNV)
DNV Chair in Corrosion
G. S. Frankel
7/1/2007 – 6/30/2010
$480,000
7/1/2010 – 6/30/2013
$360,000
7/1/2013 – 6/30/2016
$637,096
DNV Roger W. Staehle Designated Professorship
3/31/2014 – 4/1/2017
$170,000

Equipment Grants

1. Matching funds on AFOSR equipment money in contract entitled *Al and Al Alloy Corrosion*.
G. S. Frankel
1996
$85,000 from Ohio Board of Regents Action Fund + $85,000 from OSU

2. AFOSR DURIP
Localized Corrosion Analysis Laboratory
R. G. Buchheit and G. S. Frankel

1998
$150,975 + $75,487 from Ohio Board of Regents Action Fund + $75,487 from OSU

3. AFOSR
   Corrosion and Coatings Instrumentation
   R. G. Buchheit G. S. Frankel, and R. L. McCreery
   1999
   $220,000 + $110,000 from Ohio Board of Regents Action Fund + $110,000 from OSU

4. National Science Foundation
   Acquisition of multiuser x-ray photoelectron spectrometer for materials research and education
   R. L. McCreery, P. Dutta, G. Frankel, U. Ozkan, A. Epstein
   2002
   $300,000 + $150,000 from Ohio Board of Regents Action Fund + $150,000 from OSU

5. DOE
   Equipment for Corrosion and Materials Performance Studies
   G. S. Frankel and R. G. Buchheit
   2004
   $120,000 + $60,000 from Ohio Board of Regents Action Fund + $60,000 from OSU

Teaching

Teach three different classes in corrosion at OSU: an undergraduate level class including a laboratory, a graduate level class, and an advanced graduate level class for PhD students. Co-organizer and lecturer for two annual short courses on corrosion for professionals: at Ohio State and Penn State Universities. Also teach other undergraduate courses at OSU.

OSU Service

Louis Stokes Alliances for Minority Participation (LSAMP)	
Program volunteer, mentoring a minority student in MSE	2014-2015
University Committee on IP, Patents and Copyrights	2014-2016
College of Engineering Awards Committee	2012
Aerospace, Aviation, and Flight Strategic Plan Task Force	2011
University Doctoral Program Assessment Committee	2008
Welding Engineering Transition Planning Committee	2007
University Senate Faculty Hearing Committee	2006-2010
MSE Interim Executive Committee	2003-2004
MSE Graduate Studies Committee	1995-2002
MSE Chair Advisory Committee	1999-present
MSE Promotion and Tenure Committee, chairman	2002-2004
University Research Committee, member	2000-2003
University Research Committee, chairman	2001-2003
University Senate Ad Hoc Budget Restructuring Review Comm.	2003-2004
College of Engineering Promotion and Tenure Committee	2002-2004
VP Research Advisory Committee	2001-2003
Faculty Search Committees:	

Corrosion professor	1997
Honda Chair	1999
Computational materials professors	2000-2001
MSE Department Head	2003
Corrosion professor	2013

Professional Service

Editorial Boards

Technical Editor, *Journal of the Electrochemical Society*, 2012-present
Associate Editor, *Journal of the Electrochemical Society*, 2011.
Editorial board, *Corrosion*, 1997-present.
Editorial board, *Materials and Corrosion, Corrosion Reviews*.

The Electrochemical Society

Board of Directors, The Electrochemical Society, 2002-2004
Corrosion Division Chairman, The Electrochemical Society, 2002-2004
Corrosion Division Vice Chairman, The Electrochemical Society, 2000-2002
Corrosion Division Secretary, The Electrochemical Society, 1998-2000
Corrosion Division Executive Committee, The Electrochemical Society, 1994-2009
Finance Committee, The Electrochemical Society, 1998-2000
Membership Committee, The Electrochemical Society, 2000-2004
Chairman, Membership Committee, The Electrochemical Society, 2003-2004
Technical Affairs Committee, The Electrochemical Society, 2005-2009
Awards Committee, The Electrochemical Society, 2009-2013
Free the Science Advisory Board, The Electrochemical Society, 2016-2017

NACE

Board of Editors for *Corrosion* Journal, 1997-present
NACE Research Committee Chairman, 2004- 2006
NACE Research Committee Vice Chairman, 2002-2004
NACE Research Committee member, 1996-present
NACE Uhlig Award Committee member, 2002-2011
NACE Uhlig Award Committee chairman, 2005-2011

ASM

Handbook Committee, 2010-1013

Boards, Committees, and Panels

DOE Waste Package Materials Performance Peer Review Panel, 2001
DOE Expert Panel Workshop on Double Shell Tank Chemistry Optimization, 2004.
DOE Double Shell Tank Chemistry Optimization Expert Panel Oversight Committee, 2005-present.
Corrosion Education Workshop Organizing Committee, sponsored by The National Academies, National Materials Advisory Board, 2007.
Committee on Assessing Corrosion Education, sponsored by The National Academies, National Materials Advisory Board, 2007-2008.

Committee on Research Opportunities in Corrosion Science and Engineering, sponsored by The National Academies, National Materials Advisory Board, 2008-2010.
DOE Expert Panel Workshop on Single Shell Tank Integrity, 2008-2012.
Scientific Advisory Board, Henkel North America, 2008-present.
Nuclear Waste Technical Review Board, 2012-2016.

Symposia Organized, partial list

"Advanced Coatings and Surface Protection," MS&T, 10/10, Houston.
"Corrosion in Biofuels," Fall ECS Meeting, 10/10, Las Vegas.
"ISE Spring Meeting in honor of the 100th Birthday of Mars Fontana," 5/10, Columbus.
"Corrosion Protective Surface Coatings," Fall ECS Meeting, 10/09, Vienna
"Critical Factors in Localized Corrosion, VI, in honor of Prof. Shibata," Fall ECS Meeting 10/08, Honolulu
"Critical Factors in Localized Corrosion, IV, in honor of Hans Boehni," Fall ECS Meeting, 10/02, Salt Lake City.
"Corrosion Science, A Perspective and Current Status, a symposium in honor of Robert P. Frankenthal, Spring ECS Meeting, 4/02, Philadelphia.
"Localized Corrosion," Research Topical Symposium, NACE, Corrosion01, Houston
Gordon Conference on Aqueous Corrosion, July, 2000, New London, NH.
"Critical Factors in Localized Corrosion, III," Fall ECS Meeting, 11/98, Boston.
"Organic and Inorganic Corrosion Inhibitors," Spring ECS Meeting, 5/98, San Diego.
"Research in Progress," NACE Corrosion98, 3/98, San Diego.
"Critical Factors in Localized Corrosion, II," Fall ECS Meeting, 10/95, Chicago.
"Critical Factors in Localized Corrosion," Fall ECS Meeting, 10/91, Phoenix.

Awards to Students (bold are non-poster awards)

Greg Omweg, 1st place, STG 34 Refining and Gas Processing Student Poster Award, NACE Corrosion2001, Houston.
Xiaodong Liu, 2nd place, Mars Fontana Student Poster Award in Corrosion Engineering, NACE Corrosion2002, Denver.
Qingjiang Meng, 3rd place, Marcel Pourbaix Student Poster Award in Corrosion Science, NACE Corrosion2002, Denver.
Xinyan Zhao, 2nd place, Harvey Herro Student Poster Award in Applied Corrosion Technology, NACE Corrosion2003, San Diego.
Jiho Kang, 3rd place, Mars Fontana Student Poster Award in Corrosion Engineering, NACE Corrosion2003, San Diego.
Thodla Ramgopal, Morris Cohen Graduate Student Award of the ECS Corrosion Division, 2003.
Greg Omweg, W. H. Hobart Award from the American Welding Society for best contribution to Welding Journal in the area of pipe welding, 2004.
Qingjiang Meng, Morris Cohen Graduate Student Award of the ECS Corrosion Division, 2004.
Yeong Ho Kim, 2nd Place, Mars Fontana Student Poster Award in Corrosion Engineering, NACE Corrosion2004, New Orleans.
Mariano Iannuzzi, 1st Place, Marcel Pourbaix Student Poster Award in Corrosion Science, NACE Corrosion2006, San Diego.

Mariano Iannuzzi, Graduate Student Book Award from the NACE Foundation, 2006.
Dong Liang, 1st Place, Mars Fontana Student Poster Award in Corrosion Engineering, NACE Corrosion2008, New Orleans.
Dong Liang, Graduate Student Book Award from the NACE Foundation, 2009.
Mariano Iannuzzi, Morris Cohen Graduate Student Award of the ECS Corrosion Division, 2009.
Brendy Rincon, NACE Foundation Academic Scholarship, 2011.
Xiaoji Li, 1st Place, Harvey Herro Poster Award in Applied Corrosion Technology, NACE2011, Houston.
Liu Cao, 3rd Place, Mars Fontana Student Poster Award in Corrosion Engineering, NACE2011, Houston.
Brendy Rincon, 2nd Place, Richard Kinzie Student Poster Award, 2011 DoD Corrosion Conference, La Qinta, CA.
Liu Cao, 3rd Place, Marcel Pourbaix Student Poster Award in Corrosion Science, NACE2012, Salt Lake City.
Omar Lopez-Garrity, 2nd Place, Marcel Pourbaix Student Poster Award in Corrosion Science, NACE2012, Salt Lake City.
Huang Lin, 1st Place, Mars Fontana Student Poster Award in Corrosion Engineering, NACE2012, Salt Lake City.
Mariano Kappes, Morris Cohen Graduate Student Award of the ECS Corrosion Division, 2012.
Brendy Rincon, 2nd Place, Marcel Pourbaix Student Poster Award in Corrosion Science, NACE2013, Orlando.
Omar Lopez-Garrity, 1st Place, Mars Fontana Student Poster Award in Corrosion Engineering, NACE2013, Orlando.
Jinwook Seong, NACE Foundation Graduate Student Book Award, NACE2015, Dallas.
Xi Wang, 1st Place Harvey Herro Student Poster Award in Corrosion Engineering, NACE2017, New Orleans.
Xi Wang, 2nd Place Richard Kinzie Award for Applied Corrosion Technology, 2017 DoD-Allied Nations Conference, Birmingham.
Liu Cao, Campbell Young Author Award from NACE Internatinal, 2018.
Anup Panindre, 3rd Place Mars Fontana Student Poster Award in Corrosion Engineering, NACE2018, Phoenix.
Angiere Huggins, Outstanding Student Poster Award from NACE STG 34, NACE2018, Phoenix.

Consultancy (partial list)

HMT Technology, Inc, helped develop corrosion measurement capability, 1996.
Atomic Energy Control Board of Canada, assessed research program on deuterium uptake by Zr alloys and developed model, 1996.
Carpenter Technology, expert witness regarding corrosion failure, 1996-98.
ASiMI, expert witness regarding reactor failure, 1997-99.
Ford Motor Corp, tube corrosion problem, 1997.
In-Sink-Erator (division of Emerson Electric Co.), consultation on new disposer design, 1998.
City of Columbus, expert witness regarding personal injury claim, 1999.
Dormont Manufacturing, advice on failure analyses, 1999-2006.

Gilbane Construction, advice on corroded Al window frames, 1999.
OLI Systems, Inc., member of Academic Review Board on DOE project 2000-2002.
Holophane, advice on lighting fixtures, 2001-2002.
Seagate Technology, advice on electrochemical testing, 2003.
CH2M Hill Hanford Group, advice on corrosion of waste storage tanks, 2004-2010.
Lexmark Corp, advice on corrosion, 2007.
City of Akron, lawsuit on pipeline corrosion, 2010.