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Engineering & Scientific Consulting

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Professional Profile

Dr. Pound specializes in electrochemistry and corrosion science, with emphasis on corrosion evaluation, testing, protection, and failure analysis. His expertise includes general and localized corrosion, galvanic corrosion, microbiologically influenced corrosion, atmospheric corrosion, hydrogen absorption, and different types of corrosion protection (coatings, corrosion inhibitors, electroplating, and electroless deposition).

Dr. Pound has investigated corrosion issues associated with concrete, gas and water pipelines, marine and geothermal systems, and electronics/electrical components including electrolytic capacitors and plated contacts. He has extensive experience in using electrochemical techniques such as cyclic potentiodynamic polarization and electrochemical impedance spectroscopy to evaluate the corrosion performance of biomedical implants and other devices. Dr. Pound has also worked in other areas of electrochemistry involving fuel cell, battery, and electrolysis technologies.

Prior to joining Exponent, Dr. Pound was Director of the Electrochemistry Department of SRI International, where he managed research projects supported by the Office of Naval Research, Gas Research Institute, Electric Power Research Institute, and commercial clients. He has also held several other research positions including Senior Research Associate at the Fontana Corrosion Center of Ohio State University and Research Fellow in the Electrochemistry Department of the University of Auckland, New Zealand.

Academic Credentials & Professional Honors

Ph.D., Electrochemistry, Victoria University of Wellington, NZ, 1977

M.S., Chemistry, Victoria University of Wellington, NZ, 1974

B.S., Chemistry, Victoria University of Wellington, NZ, 1972

Brian D. England Scholarship

Rocklabs-Prochem Award in Chemistry Invention Competition

Professional Affiliations

Electrochemical Society (member)

NACE International (member)

ASM International (member)

Patents

Patent 6,617,488: Method and Apparatus for Indicating the Conditions in an Absorbent Article, September 2003 (with J.S. Springer and J.L. Tappa).

Patent 5,985,476: Stable High Conductivity Functionally Gradient Compositionally Layered Solid State Electrolytes and Membranes, November 1999 (with E.D. Wachsman, P. Jayaweera, and D.M. Lowe).

Publications

Pound BG. The electrochemical behavior of nitinol in simulated physiological solutions. J Biomed Mater Res, in press.

Pound BG. Susceptibility of nitinol to localized corrosion. J Biomed Mater Res 2006; 77A:185-191.

Pound BG, Gorfu Y, Schattner P, Mortelmans M. Ultrasonic mitigation of microbiologically influenced corrosion in natural gas pipeline facilities. Corrosion 2005; 61:452-463.

Eckert R, Aldrich H, Pound BG. Biotic pit initiation on pipeline steel in the presence of sulfate reducing bacteria. CORROSION/2004. Paper No. 04590, NACE Int., 2004.

Duffner DH, Hopkins SW, Pound BG. Strength reduction in screw fasteners resulting from outdoor exposure. Practical Failure Analysis 2003; 3:57-64.

Pound BG. The effect of aging on hydrogen trapping in precipitation-hardened alloys. Corrosion Sci 2000; 42:1941-1956.

Pound BG. The ingress of hydrogen into precipitation-hardened alloys A-286 and C17200. Corrosion Sci 2000; 42:1269-1281.

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Pound BG. Hydrogen trapping in high-strength alloys. Acta Mater 1998; 46:5733-5743.

Yashiro H, Pound B, Kumagai N, Tanno K. Effect of permeated hydrogen on the pitting of type 304 stainless steel. Corrosion Sci 1998; 40:781-791.

Uhlemann M, Pound BG. Diffusivity, solubility, and trapping behavior of hydrogen in alloys 600, 690tt, and 800. Corrosion Sci 1998; 40:645-662.

Jargelius-Pettersson RFA, Pound BG. Examination of the role of molybdenum in passivation of stainless steels using AC impedance spectroscopy. J Electrochem Soc 1998; 145:1462-1469.

Wachsman ED, Jayaweera P, Jiang N, Lowe DM, Pound BG. Stable high conductivity ceria/bismuth oxide bilayered electrolytes. J Electrochem Soc 1997; 144:233-236.

Pound BG. The effect of heat treatment on hydrogen trapping in AerMet 100 and alloy K-500. Proceedings, Tri-Service Conference on Corrosion. NSWC and NACE Int., 1997.

Pound BG. Hydrogen trapping in aged β-titanium alloys. Acta Mater 1997; 45:2059-2068.

Pound BG. The role of traps in determining the resistance to hydrogen embrittlement. Proceedings, 5th

International Conference on Hydrogen Effects on Material Behavior. N.R. Moody and A.W. Thompson AW (eds), TMS, pp 115-130, 1996.

Pound BG. The effect of aging on hydrogen trapping in β-titanium alloys. Acta Mater 1994; 42:1551-1559.

Pound BG. The resistance of high-strength alloys to hydrogen embrittlement. Proceedings, Tri-Service Conference on Corrosion, Army Materials Technology Laboratory, U.S. Army, pp. 409-420, 1994.

Pound BG. The ingress of hydrogen into copper-nickel alloys. Corrosion 1994; 50:301-307.

Pound BG. A comparison of hydrogen ingress behavior in alloys 625 and 716. Scripta Metall Mater 1993; 29:1433-1438.

Pound BG. Predicting the susceptibility to hydrogen embrittlement. Proceedings, 12th International Corrosion Congress, Paper No. 147, NACE Int., pp 2356-2366, 1993.

Pound BG. Response to comment on the characterization of doped CeO2 electrodes in solid oxide fuel cells. Solid State Ionics 1993; 61:281-284.

Pound BG. The effect of surface roughness on the AC impedance of palladium in sulfuric acid. Electrochim Acta 1993; 38:2021-2027.

Pound BG. The characterization of doped CeO2 electrodes in solid oxide fuel cells. Solid State Ionics 1992; 52:183-188.

Macdonald DD, Urquidi-Macdonald M, Bhakta SD, Pound BG. The electrochemical impedance of porous nickel electrodes in alkaline media: II. Nonuniform transmission line analysis. J Electrochem Soc 1991; 138:1359-1363.

Pound BG. The use of a potentiostatic pulse technique to determine the efficiency of hydrogen absorption by alloys. J Appl Electrochem 1991; 21:967-972.

Bhakta SD, Macdonald DD, Pound BG, Urquidi-Macdonald M. The electrochemical impedance of porous nickel electrodes in alkaline media: I. Experimental studies. J Electrochem Soc 1991; 138:1353-1358.

Pound BG. Hydrogen trapping in work-hardened alloys. Acta Metall Mater 1991; 39:2099-2105.

Pound BG. Hydrogen ingress in titanium. Corrosion 1991; 47:99-104.

Pound BG, Becker C. Composition of surface oxides on nickel-base superalloys. J Electrochem Soc 1991; 138:696-700.

Macdonald DD, Pound BG, Lenhart SJ. The application of electrochemical impedance spectroscopy for characterizing the degradation of Ni(OH)2/NiOOH electrodes. J Power Sources 1990; 29:477-502.

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Pound BG. Hydrogen trapping in precipitation-hardened alloys. Acta Metall Mater 1990; 38:2373-2381.

Pound BG. Hydrogen ingress in high strength alloys exposed to different electrolytes. Corrosion 1990; 46:50-56.

Ocken H, Pound BG, Lister DH. Deposition and characterization of electroless palladium on austenitic stainless steel. Thin Solid Films 1989; 171:313-322.

Pound BG. The application of a potentiostatic pulse technique to hydrogen ingress in high strength alloys. Corrosion 1989; 45:18-25.

Pound BG, Sharp RM, Wright GA. The anodic behavior of iron in hydrogen sulfide solutions. Corrosion 1989; 45:386-392.

Lei KS, Macdonald DD, Pound BG, Wilde BE. Breakdown of the passive film on polycrystal and single crystal nickel (100) by chloride ions. J Electrochem Soc 1988; 135:1625-1632.

Lenhart SJ, Macdonald DD, Pound BG. An AC impedance study of the degradation of porous nickel battery electrodes. J Electrochem Soc 1988; 135:1063-1071.

Macdonald DD, Liang RY, Pound BG. An AC impedance study of the passive film on single crystal nickel (111) in phosphate solutions. J Electrochem Soc 1987; 134:2981-2986.

Pound BG, Sharp RM, Wright GA. A potentiostatic double-step method for measuring hydrogen atom diffusion and trapping in metal electrodes. II. Experimental, Acta Metall 1987; 35:263-270.

Pound BG, Sharp RM, Wright GA. A potentiostatic double-step method for measuring hydrogen atom diffusion and trapping in metal electrodes. I. Theory. Acta Metall 1987; 35:253-262.

Pound BG, Singh RP, Macdonald DD. A thermodynamic framework for estimating the efficiencies of alkaline batteries. J Power Sources 1986; 18:1-31.

Pound BG, Sharp RM, Wright GA. The corrosion of carbon steel and stainless steels in simulated geothermal media. Aust J Chem 1985; 38:1133-1140.

Pound BG, Sharp RM, Wright GA. Electrochemical phase diagrams for iron in geothermal media. Aust J Chem 1985; 38:643-657.

Macdonald DD, Urquidi M, Pound BG. Point defect model for the growth and breakdown of passive films on metal surfaces. Proceedings, Australasian Corrosion Association Conference, Rotorua, New Zealand, 1984.

Macdonald DD, Pound BG, Singh RP. Extension of potential-pH diagrams to concentrated aqueous solutions. Proceedings, Pourbaix Symposium, Electrochem Soc Meeting, New Orleans, LA, p. 69, 1984.

Lenhart SJ, Macdonald DD, Pound BG. Restructuring of porous nickel electrodes. Proceedings, 19th IECEC Conference, San Francisco, CA, p. 875, 1984.

Pound BG, Abdurrahman MH, Glucina MP, Sharp RM, Wright GA. The measurement of corrosion rates of carbon steel and stainless steel in geothermal media by the polarization resistance technique. Proceedings, The New Zealand Geothermal Workshop, Auckland, New Zealand, 1981.

Pound BG, Bevan DJM, Bockris JO'M. The electrolysis of steam using uranium oxide electrodes. Int J Hydrogen Energy 1981; 6:473-486.

Pound BG, Sharp RM, Wright GA. Geothermal corrosion of steel. Proceedings, The New Zealand Geothermal Workshop, Auckland, New Zealand, pp. 33-36, 1980.

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Pound BG, Sharp RM, Wright GA. Metallic corrosion in geothermal media. Proceedings, 33rd Annual Conference of the Australasian Institute of Metals, Auckland, New Zealand, pp. 130-133, 1980.

Pound BG, Sharp RM, Wright GA. Electrochemical studies of geothermal corrosion. Proceedings, The New Zealand Geothermal Workshop, Auckland, New Zealand, pp. 239-244, 1979.

Pound BG, Macdonald DD, Tomlinson JW. The electrochemistry of silver in KOH solutions at elevated temperatures. IV. AC Impedance study. Electrochim Acta 1982; 27:1489-1500.

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Book Chapters

Pound BG. Hydrogen ingress during corrosion. In: Encyclopedia of Electrochemistry: Corrosion and Oxide Films, Vol. 4. Stratmann M and Frankel G (eds), Wiley-VCH, Weinheim, Germany, pp. 108-155, 2003.

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Selected Technical Reports

Pound BG, Brossia S, Moghissi O, Sridhar N. Differentiation of corrosion mechanisms by morphological feature characterization. Gas Research Institute, Chicago, IL, 2004.

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Dougherty B, Pound BG. Development of corrosion rate monitors for reinforced concrete. National Cooperative Highway Research Program, Washington DC, and California Department of Transportation, Sacramento, CA, 1996.

Wachsman ED, Pound BG, Jayaweera P, Jiang N, Lowe D, Sanjurjo A. Demonstration of a stable high ionic conductivity solid oxide electrolyte. Gas Research Institute, Chicago, IL, 1996.

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Schmidt CG, Becker CH, Crocker JE, Homma H, Kanazawa CH, Kobayashi T, Moro L, Pound BG, Simons JW. Application of new experimental methods to pipeline stress corrosion cracking. Gas Research Institute, Chicago, IL, 1994.

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Cox P, Pound BG, Hettiarachchi S. The behavior of concrete in seawater and marine environments. ENEL/CRTN, Italy, 1992.

Kobayashi T, Pound BG, Crocker JE, Schmidt CG, Shockey DA. Relating nucleation and growth of stress corrosion cracks to changes in electrochemical parameters. Electric Power Research Institute, Palo Alto, CA, 1992.

Jayaweera P, Hettiarachchi S, Pound BG. Improved feedwater flow measurements of zeta potentials. Electric Power Research Institute, Palo Alto, CA, 1992.

Frese Jr KW, Pound BG. The electrochemical oxidation of methane at metal and oxide electrodes. Gas Research Institute, Chicago, IL, 1990.

Krishnan GN, Pound BG. Evaluation of hydrogen sulfide conversion processes. Gas Research Institute, Chicago, IL, 1989.

Pound BG. Evaluation of a diffusion/trapping model for hydrogen ingress in high-strength alloys. Office of Naval Research, Arlington, VA, 1988.

Pound BG. A review of prefilming treatments to reduce radiation fields in nuclear reactors. Electric Power Research Institute, Palo Alto, CA, 1986.

Pound BG. Deposition of palladium on AISI type 304 stainless steel. Electric Power Research Institute, Palo Alto, CA, 1986.

Pound BG, Sharp RM, Wright GA. Geothermal corrosion. New Zealand Energy Research and Development Committee, 1985.

Lenhart SJ, Pound BG, Macdonald DD. An electrochemical and morphological study of the effect of temperature on the restructuring and loss of capacity of alkaline battery electrodes. Department of Energy, Washington DC, 1984.

Pound BG, Sundararaj B, Singh RP, Macdonald DD. A thermodynamic framework for estimating the efficiencies of alkaline batteries. Department of Energy, Washington DC, 1984.

Selected Invited Presentations

Pound BG. Comparison of hydrogen trapping correlations with field service results for alloy K-500. CORROSION99, Paper No. 633, NACE Int., 1999.