

# **JAMES W. EVANS**

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and

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**Date and Place of Birth** Aug. 22, 1943, England

**Citizenship:** USA

## **Education**

B.Sc. (Chemistry), University of London, England, 1964

Ph.D. (Chemical Engineering), State University of New York at Buffalo, 1970

## **Professional Experience**

1964-65 Technical Advisor, International Computers, Ltd., London, England

1965-67 Chemist, Cyanamid of Canada, Ltd., Niagara Falls, Ontario, Canada

1970-72 Engineer, Ethyl Corporation, Baton Rouge, Louisiana

1972-76 Assistant Professor of Metallurgy, Department of Materials Science and Mineral Engineering, University of California, Berkeley

1977- Principal Investigator, Materials Science Division/Energy & Environmental Technologies Division, Lawrence Berkeley Laboratory

1976-80 Associate Professor of Metallurgy, Department of Materials Science and Mineral Engineering, University of California, Berkeley

1981 Visiting Professor, Ecole Nationale Supérieure de Magnétohydrodynamique de Grenoble, France

1980- Professor of Metallurgy, Department of Materials Science and Mineral Engineering, University of California, Berkeley

1986-90 Chairman, Department of Materials Science and Mineral Engineering, University of California, Berkeley

2003- P. Malozemoff Endowed Chair in Mineral Engineering, University of California, Berkeley

## **Professional Societies**

The Minerals, Metals and Materials Society

Iron and Steel Institute of Japan

The Electrochemical Society

## **Awards**

Clifford C. Furnas Memorial Fellowship, State University of New York at Buffalo (1969-70).

Awarded to the most outstanding graduate student at SUNY, Buffalo.

Extractive Metallurgy Science Award of AIME, 1973. Awarded for the best paper on the science of extractive metallurgy appearing in Institute publications for past two years.

Extractive Metallurgy Science Award of AIME, 1983

Champion H. Mathewson Gold Medal of the Metallurgical Society of AIME, 1984

Extractive and Processing Lecturer of AIME, 1994

Clifford C. Furnas Memorial Award, State University of New York at Buffalo, 1994

Chancellor's Professorship, UC Berkeley, 1996 - 1999

D.K.C. MacDonald Lecturer, 9th Canadian Materials Science Conference, Québec, 1997

Light Metals Technical Service Award of TMS, 2001

Extraction and Processing Science Award of TMS, 2002

Aluminum Distinguished Service Award of TMS, 2002

Plato Malozemoff Endowed Chair in Mineral Engineering, 2003-

James Douglas Gold Medal of AIME (for "distinguished achievement in nonferrous metallurgy"), 2004

The Brimacombe Prize (awarded for "...a single or sustained contribution to materials process engineering deemed outstanding."), 2004

Fellow, The Minerals, Metals and Materials Society, 2010

## **Former students**

33 Ph.Ds. and 32 M.S. students graduated. Mostly now in industry; five are faculty (IIT Kanpur, University of Michigan, National Taiwan University, City College of NY)

## **Publications in Refereed Archival Journals**

1. "Transient Radiative Heat Loss from Ladles, Molds or Cylindrical Cavities" (with J. Szekely), JOM-J. Min. Met. Mat. S, vol. 20, p. A8 (1968).
2. "Some General Properties of Gas-Solid Reaction Systems Involving a Moving Boundary" (with J. Szekely), JOM-J. Min. Met. Mat. S, vol. 20, p. A8 (1968).
3. "Structural Effects in Gas-Solid Reactions" (with J. Szekely), JOM-J. Min. Met. Mat. S, vol. 21, p. A11 (1969).
4. "Radiative Heat Loss from the Surface of Molten Steel Held in a Ladle" (with J.

- Szekely), Trans. AIME, Vol. 245, pp. 1149-1159 (1969).
5. "A Structural Model for Gas-Solid Reactions with a Moving Boundary" (with J. Szekely), Chem. Eng. Sci., Vol. 25, pp. 1091-1107 (1970).
  6. "Recent Papers Concerning Gas-Solid Reactions", J. Catalysis, Vol. 20, pp. 122-124 (1971).
  7. "Studies in Gas-Solid Reactions: Part I. A Structural Model for the Reaction of Porous Oxides with a Reducing Gas" (with J. Szekely), Met. Trans., Vol. 2, pp. 1691-1698 (1971).
  8. "Studies in Gas-Solid Reactions: Part II. An Experimental Study of Nickel Oxide Reduction with Hydrogen" (with J. Szekely), Met. Trans, Vol. 2, pp. 1699-1710 (1971).
  9. "A Structural Model for Gas-Solid Reactions with a Moving Boundary: Part II. The Effect of Grain Size, Porosity and Temperature on the Reaction of Porous Pellets" (with J. Szekely), Chem. Eng. Sci, Vol. 26, pp. 1901-1913 (1971).
  10. "Gas-Solid Reactions: The Viscous Flow Term", Can. J. Chem. Eng., Vol. 50, pp. 811-814 (1972).
  11. "On the Optimum Temperature Progression for Irreversible Non-Catalytic Gas-Solid Reactions" (with J. Szekely, W. H. Ray and Y. K. Chuang), Chem. Eng. Sci., Vol. 28, pp. 683-690 (1973).
  12. "A Model for the Design and Optimization of Gas-Solid Reactors" (with S. Song), Met. Trans., Vol. 4, pp. 1701-1707 (1973).
  13. "Gas-Solid Reactions: The Viscous Flow Term (Non-Equimolar Fluxes)" (with S. Song), Can. J. Chem. Eng., Vol. 51, pp. 616-617 (1973).
  14. "Application of a Porous Pellet Model to Fixed, Moving, and Fluidized Bed Gas-Solid Reactors" (with S. Song), I. and E. C. Process Design and Development, Vol. 13, pp. 146-152 (1974).
  15. "Geometric Instability in Gas-Solid Reactions", Chem. Eng. Sci., Vol. 29, 1660-1662 (1974).
  16. "The Reduction of Nickel Oxide by Hydrogen; Measurements in a Fluidized Bed and in a Gravimetric Apparatus" (with S. Song and C. E. Leon Sucre), Met. Trans., Vol. 7B, pp. 55-65 (1976).
  17. "Measurement of the Rate of Reduction Reactions by the Torsion Technique" (with K. Haase), J. High Temp. Sci., Vol. 8, pp. 167-177 (1976).

18. "Fluid Velocities in Induction Melting Furnaces: Part I. Theory and Laboratory Experiments" (with E. D. Tarapore), *Met. Trans.*, Vol. 7B, pp. 343-351 (1976).
19. "Electrical Conduction in Fluidized Bed Electrodes: Its Significance and Some Experimental Measurements" (with B. J. Sabacky), *Met. Trans.*, Vol. 8B, pp. 5-13 (1977).
20. "Fluid Velocities in Induction Melting Furnaces: Part II. Large Scale Experiments and Calculations" (with E. D. Tarapore and J. Langfeldt), *Met. Trans.*, Vol. 8B, pp. 179-184 (1977).
21. "The Grain Model for Gas-Solid Reactions; a Refined Approximate Solution to the Equations" (with M. Ranade), *Chem. Eng. Sci.*, Vol. 35, pp. 1261-1262 (1980).
22. "Electrodeposition of Metals in Fluidized Bed Electrodes: Part I. Mathematical Models" (with B. J. Sabacky), *J. Electrochem. Soc.*, Vol. 126, pp. 1176-1180 (1979).
23. "Electrodeposition of Metals in Fluidized Bed Electrodes: Part II. An Experimental Study of Copper Electrodeposition at High Current Densities" (with B. J. Sabacky), *J. Electrochem. Soc.*, Vol. 126, pp. 1181-1186 (1979).
24. "Structure and Reduction Characteristics of Some Venezuelan Iron Ores" (with C.-H. Koo), *Trans. Iron Steel Inst. Japan*, Vol. 19, pp. 95-101 (1979).
25. "Advances in Extractive Metallurgy" (book review), *Intl. J. Mineral Processing*, Vol. 5, pp. 319-320 (1978).
26. "The Influence of Lime Properties on the Rate of Dissolution in CaO-FeO-SiO<sub>2</sub> Slags" (with C. A. Natalie), *Ironmaking and Steelmaking*, Vol. 6, No. 5, pp. 101-109 (1979).
27. "The Reaction Between a Gas and a Solid in a Non-Isothermal Packed Bed: Simulation and Experiments" (with M. Ranade), *I. and E. C. Process Design and Development*, Vol. 19, pp. 118-123 (1980).
28. "Production of Aluminum and Aluminum Coatings by Thermal Decomposition of Aluminum Alkyls" (with A. Malazgirt), *Met. Trans.*, Vol. 11B, pp. 225-232 (1980).
29. "Mass Transfer with Chemical Reaction" (review with approx. 200 refs.), *Minerals Sci. Engineering*, Vol. 11, pp. 207-223 (1979).
30. "Complex Metallurgy '78" (book review), *Intl. J. Mineral Processing*, Vol. 6, pp. 168-169 (1979).

31. "Computation of Melt Velocities and Current Efficiency in Hall-Heroult Cells " (with Y. Zundeleovich), J. Electrochem. Soc., vol. 126, p. C136 (1979).
32. "Ex-Situ and In-Situ Studies of the Reduction of Nickel Oxide Single Crystals Using Transmission Electron Microscopy" (with J. A. Little and K. H. Westmacott), JOM-J. Min. Met. Mat. S, vol. 31, p. 57 (1979).
33. "Monte Carlo Simulation of the Diffusion of Gases in Porous Solids" (with M. H. Abbasi and A. Sarin), In Situ, vol. 3, p. 166 (1979).
34. "Electrodeposition of Copper and Cobalt on Fluidized-Bed Electrodes" (with B. J. Sabacky and I. Masterson), J. Electrochem. Soc., vol. 126, p. C140 (1979).
35. "A Monte Carlo Simulation of the Diffusion of Gases in Porous Solids" (with M. H. Abbasi and A. Sarin), J. Chem. Phys., Vol. 72, pp. 2967-2973 (1980).
36. "Early Stages of the Reduction of Nickel Oxide Single Crystals: An Investigation by Transmission Electron Microscope" (with J. A. Little and K. H. Westmacott), Met. Trans., Vol. 11B, pp. 519-524 (1980).
37. "The Use of a Fluidized Bed Cathode for Selective Deposition of Metals from Aqueous Solutions" (with M. Dubrovsky), JOM-J Min. Met. Mat., vol. 32, p. 10 (1980).
38. "Fluidized Bed Electrowinning of Copper; Experiments Using 150 Amp and 1,000 Amp Cells and Some Mathematical Modeling" (with I. Masterson), Met. Trans., Vol. 13B, pp. 3-13 (1982).
39. "An Investigation of Fluidized Bed Electrowinning of Cobalt Using 50 and 1,000 Amp Cells" (with M. Dubrovsky), Met. Trans., Vol. 13B, pp. 293-301 (1982).
40. "Monte Carlo Simulation of Radiant Transport Through an Adiabatic Packed Bed or Porous Solid" (with M. H. Abbasi), AIChE Journal, Vol. 28, pp. 853-854 (1982).
41. "A Mathematical Model for Prediction of Currents, Magnetic Fields, Melt Velocities, Melt Topography and Current Efficiency on Hall-Heroult Cells " (with Y. Zundeleovich and D. Sharma), Met. Trans., Vol. 12B, pp. 353-360 (1981).
42. "A Preliminary Investigation of Some Anodes for Use in Conjunction with Fluidized Bed Electrodeposition of Metals" (with D. Ziegler and M. Dubrovsky), J. Applied Electrochem., Vol. 11, pp. 625-637 (1981).
43. "Simulation Numérique des Fours Chauffés Par Induction" [Numerical Simulation of Induction Heated Furnaces] (with J. N. Barbier, Y. R. Fautrelle and P. Cremer),

- J. de Mécanique, Théorique et Appliquée, Vol. 1, pp. 533-556 (1982).
44. "Identification of the Origin of TiO<sub>2</sub> Deposits on a Hydrodesulfurisation Catalyst" (with D. J. Coates and S. S. Pollack), LBL Report #13244, Fuel, Vol. 61, pp. 1245-1248 (1982).
  45. "Physical Chemistry of High Temperature Technology" (book review), AIChE Journal, Vol. 28, p. 868 (1982).
  46. "The Diffusion of Gases in Porous Solids: Monte Carlo Simulations in the Knudsen and Ordinary Diffusion Regimes" (with M. H. Abbasi and I. S. Abramson), AIChE Journal, Vol. 29, pp. 617-624 (1983).
  47. "The Hall-Heroult Cell: Some Design Alternatives Examined by a Mathematical Model" (with S. D. Lympny), LBL Report #14386, Met. Trans., Vol. 14B, pp. 63-70 (1983).
  48. "An Improved Mathematical Model for Melt Flow in Induction Furnaces and Comparison with Experimental Data" (with S. D. Lympny), LBL Report #15170, Met. Trans., Vol. 14B, pp. 306-308 (1983).
  49. "Defects in Antiferromagnetic Nickel Oxide" (with D. J. Coates and K. H. Westmacott), J. Materials Science, Vol. 17, p. 3281 (1982).
  50. "An Electron Microscopy Study of the Low Temperature Catalysed Steam Gasification of Graphite" (with D. J. Coates, A. L. Cabrera, G. A. Somorjai and H. Heinemann), LBL Report #14463, J. Catalysis, Vol. 180, pp. 215-220 (1983).
  51. "The Relationship Between Pore Classes in a Solid Computed by a Monte Carlo Technique" (with Y. Nakano), Powder Technology, Vol. 35, pp. 115-118 (1983).
  52. "Monte Carlo Simulation of Diffusion of Gases in a Porous Solid: Calculations for a New Class of Solids" (with Y. Nakano), J. Chem. Physics, Vol. 78, pp. 2568-2572 (1983).
  53. "The Fluidized Bed Electrowinning of Silver" (with T. Huh and C. Carey), Met. Trans., Vol. 14B, pp. 353-357 (1983).
  54. "In-Situ Observations of the Gasification of Carbon Catalyzed by Calcium Oxide" (with D. J. Coates and H. Heinemann), Applied Catalysis, Vol. 7, pp. 233-241 (1983).
  55. "A Structural Model for Multi-Step Reactions Between a Gas and a Porous Solid" (with C.-H. Koo), J. Chin. Inst. Chem. Engineers, Vol. 13, pp. 79-85 (1982).
  56. "Electrolyte Circulation in Electrowinning and Electrorefining Cells" (with D.

- Ziegler), ), JOM-J. Min. Met. Mat. S., vol. 35, p. 12 (1982).
57. "Diffusion and Flow of Gases in Porous Solids – Predictions and Measurements" (with K. Akanni and C. Palmer), JOM-J. Min. Met. Mat. S., vol. 35, p. 86 (1983).
  58. "The Reduction of Iron-Oxide – In Situ Studies Using High Voltage Electron Microscopes" (with M. F. Rau and D. Rieck), JOM- J. Min. Met. Mat. S., vol. 35, p. 12 (1983).
  59. "Fluidized Bed Electrodes", Chem. Eng., vol. 90, p. 5 (1983).
  60. "An Analysis of the Hydrodynamics of Aluminum Reduction Cells" (with R. Moreau), J. Electrochem. Soc., Vol. 131, pp. 2251-2259 (1984).
  61. "Fluidized Bed Electrowinning of Zinc" (with V. Jiricny), Met. Trans., Vol. 15B, pp. 623-631 (1984).
  62. "Fluid-Solid Reaction Models in Hydrometallurgy; A Comparison with Data on the Leaching of Chrysocolla" (with C.-H. Koo), Chin. J. Materials Science, Vol. 16A, pp. 48-55 (1984).
  63. "Fluidized Bed Electrowinning of Zinc from Impure Weakly Acidic Sulfate Solutions" (with M. Dubrovsky), Trans. Inst. Mining and Metallurgy, Vol. 94, pp. C121-124 (1985).
  64. "Velocity Measurements in Wood's Metal Using an Incorporated Magnet Probe" (with H.-C. Lee and C. Vives), Met. Trans., Vol. 15B, pp. 734-736 (1984).
  65. "Observation of Iron Oxide Reduction by Controlled Atmosphere Electron Microscopy" (with M. F. Rau and D. Rieck, JOM-J. Min. Met. Mat. S, vol. 36, p. 15 (1984).
  66. "The Effect of Potential Fluctuations on the Morphology of Zinc Electrodeposits" (with V. Jiricny and T. Huh), JOM-J. Min. Met. Mat. S, vol. 36, p. 69 (1984).
  67. "An Investigation of Sulfite Ion Oxidation as an Alternative Anodic Reaction in Fluidized Bed Electrowinning or other High Rate Electrolysis Cells" (with K. A. Spring), J. Applied Electrochem., Vol. 15, pp. 609-618 (1985).
  68. "Mathematical Modeling of Electrolyte Circulation in Cells with Planar Vertical Electrodes - Part I. Electrorefining Cells" (with D. Ziegler), J. Electrochem. Soc., Vol. 133, pp. 559-566 (1986).
  69. "Mathematical Modeling of Electrolyte Circulation in Cells with Planar Vertical Electrodes - Part II. Electrowinning Cells" (with D. Ziegler), J. Electrochem. Soc.,

Vol. 133, pp. 567-575 (1986).

70. "Fluidized Bed Electrowinning of Zinc from Chloride Electrolytes" (with N. E. Tuffrey and V. Jiricny), *Hydrometallurgy*, Vol. 15, pp. 33-54 (1985).
71. "Collision Frequencies of Gas Molecules with Pore Walls" (with Y. Nakano, S. Iwamoto and K. Akai), *Chem. Eng. Commun.*, Vol. 42, pp. 129-138 (1986).
72. "Effect of Grain Boundary Migration on Apparent Boundary Diffusion Coefficients" (with A. M. Glaeser), *Acta Met.*, Vol. 34, pp. 1545-1552 (1986).
73. "Investigation of Iron Oxide Reduction by TEM" (with M.-F. Rau and D. Rieck), *LBL Report #22108, Met. Trans.*, Vol. 18B, pp. 257-278 (1987).
74. "Effective Transport Coefficients in Heterogeneous Media: Monte Carlo Simulation of Gas Diffusion in Porous Solids" (with K. A. Akanni and I. S. Abramson), *Chem. Eng. Science*, Vol. 42, pp. 1945-1954 (1987).
75. "Zinc Electrodeposit Morphology Under Conditions of Fluctuating Current Density" (with V. Jiricny and H. Choi), *J. Applied Electrochem.*, Vol. 17, pp. 91-103 (1987).
76. "The Effect of Pore Necking on Knudsen Diffusivity and Collision Frequency of Gas Molecules with Pore Walls" (with Y. Nakano, S. Iwamoto and I. Yoshinaga), *Chem. Eng. Science*, Vol. 42, pp. 1577-1583 (1987).
77. "Some In-Situ Observations of GaAs Oxidation" (with M. Hall and M.-F. Rau), *J. Electrochem. Soc.*, Vol. 133, pp. 1934-1939 (1986).
78. "Factors Affecting the Lifetime of Inert Anodes for Aluminum Electrolysis" (with R. Keller), *J. Electrochem. Soc.*, p. C336 (1986).
79. "Electrical and Electrochemical Behavior of Fluidized Bed Electrodes. Part I: Potential Transients and Time Averaged Values" (with T. Huh), *LBL Report #20840, J. Electrochem. Soc.*, Vol. 134, pp. 308-317 (1987).
80. "Electrical and Electrochemical Behavior of Fluidized Bed Electrodes. Part II: Effective Bed Resistivities" (with T. Huh), *LBL Report #20841, J. Electrochem. Soc.*, Vol. 134, pp. 317-321 (1987).
81. "Transient Response Under Non-Ideal Potential Control. Part I: Reversible Charge Transfer Reaction" (with D. Macdonald), *J. Electrochem. Soc.*, Vol. 134, pp. 2234-2238 (1987) (LBL Report #24460).
82. "Transient Response Under Non-Ideal Potential Control. Part II: Irreversible Charge Transfer Reaction" (with D. Macdonald), *J. Electrochem. Soc.*, Vol. 134, pp. 2238-2241 (1987) (LBL Report #24461).



83. "Microcomputer Processing of Chromatographic Data" (with B. Q. Li and S. Siu), J. Chromatographic Science, Vol. 25, pp. 281-285 (1987).
84. "Thermal Oxidation of Gallium Arsenide" (with O. R. Monteiro), LBL Report #22504, J. Vac. Sci. and Tech., Vol. A7, pp. 49-54 (1989).
85. "Diffusivities and Viscosities of Some Gases at Elevated Temperatures: Gas Diffusivities in Porous Solids" (with B. Q. Li), Met. Trans., Vol. 20B, pp. 141-148 (1989).
86. "Thermal Oxidation of Indium Phosphide" (with O. R. Monteiro), LBL Report #23467, J. Electrochem. Soc., Vol. 135, pp. 2366-2369 (1988).
87. "Mathematical Modeling of Meniscus Profile and Melt Flow in Electromagnetic Casters" (with J. Sakane and B. Q. Li), Met. Trans., Vol. 19B, pp. 397-408 (1988).
88. "Effect of Fluid Flow on Mass Transfer within Small Cavities - A Reinterpretation of the Results of Alkire and Coworkers", LBL Report #24500, J. Electrochem. Soc., Vol. 135, pp. 1999-2000 (1988).
89. "Computation of Shapes of Electromagnetically Supported Menisci in Electromagnetic Casters, Part I: Calculations in Two Dimensions" (with B. Q. Li), IEEE Trans. Magnetics, Vol. 25, pp. 4443-4448 (1989).
90. "Computations of Shapes of Electromagnetically Supported Menisci in Electromagnetic Casters, Part II: Calculations in Three Dimensions" (with B. Q. Li), IEEE Trans. Magnetics. Vol. 25, pp. 4449-4453 (1989).
91. "2D and 3D Mathematical Models and a Physical Model of Electromagnetic Casters" (with B. Q. Li and D. P. Cook), ISIJ Intl., Vol. 29, pp. 1048-1055 (1989).
92. "Boundary Element Solution of Heat Convection-Diffusion Problems" (with B. Q. Li), J. Comp. Phys., Vol. 93, pp. 255-272 (1991).
93. "Fluid Flow in Pachuca (Air Agitated) Tanks: Part I. Laboratory-Scale Experimental Measurements" (with R. Shekhar), Met. Trans., Vol. 20B, pp. 781-791 (1989).
94. "Fluid Flow in Pachuca (Air Agitated) Tanks: Part II. Mathematical Modeling of Flow in Pachuca Tanks" (with R. Shekhar), Met. Trans., Vol. 21B, pp. 192-203 (1990).
95. "Measurements of Magnetic Fields and Electromagnetically Driven Melt Flow in a Physical Model of a Hall-Heroult Cell" (with S. K. Banerjee), Met. Trans., Vol. 21B, pp. 59-69 (1990).
96. "An Improved Mathematical Model for Electromagnetic Casters and Testing by a

- Physical Model" (with B. Q. Li and D. Cook), *Met. Trans.*, Vol. 22B, pp. 121-134 (1991).
97. "A Zinc-Air Cell Employing A Packed Bed Anode" (with G. Savaskan), LBL Report #28290, *Journal of Applied Electrochemistry*, Vol. 21, pp. 105-110 (1991).
  98. "A Mathematical Model for Chemical Vapor Infiltration with Microwave Heating and External Cooling" (with D. Gupta), LBL Report #29320, *J. Materials Research*, Vol. 6, pp. 810-818 (1991).
  99. "The Stability of Cylindrical Voids and of Cylinders Subject to Closure by Viscous Flow or Evaporation/Condensation" (with B. Shieh), *J. Appl. Phys.*, Vol. 70, pp. 2968-2972 (1991).
  100. "In-Situ Observation of the Orthorhombic-Tetragonal Phase Transformation in YBaCuO" (with O. R. Monteiro and S. Johnson), *J. Appl. Phys.*, Vol. 69, pp. 2414-2416 (1991).
  101. "Aluminum" (with J. W. Morris), pp. 539-558 in *Encyclopedia of Applied Physics*, Vol. 1, VCH Publishers (1991).
  102. "Further Studies of a Zinc-Air Cell Intended for Electric Vehicle Applications. Part I: Discharge" (with G. Savaskan and T. Huh), *J. Appl. Electrochem.*, Vol. 22, pp. 909-915 (1992)
  103. "Further Studies of a Zinc-Air Cell Intended for Electric Vehicle Applications. Part II: Regeneration of Zinc Particles and Electrolyte by Fluidized Bed Electrodeposition" (with G. Savaskan and T. Huh), *J. Appl. Electrochem.*, Vol. 22, pp. 916-921 (1992).
  104. "Modeling of Melt Surface and of Flow in Electromagnetic Casting", *Eur. J. Mech. B/Fluids*, Vol. 10, pp. 1-3 (1991).
  105. "Fluid Flow and Interpolar Resistance Measurements in Advanced Hall-Heroult Cells" (with R. Shekhar), *Mineral Proc. and Extractive Metallurgy Review*, Vol. 9, pp. 135-146 (1992).
  106. "Infiltration of Carbon in Pores Within Coke and Charcoal by Methane Cracking" (with Y. Shigeno), *Met. Trans.*, vol. 23B, pp. 429-435 (1992).
  107. "Some Measurements of the Penetration of Turbulence into Small Cavities" (with Y. Taniguchi), *Int. J. Heat Mass Trans.*, vol. 36, pp. 951-965 (1993).
  108. "Calculation of Temperatures in Microwave-Heated Two-Dimensional Ceramic Bodies" (with Deepak), *J. American Ceramic Society*, vol. 76, pp. 1915-1923 (1993).

109. "A Mathematical Model for Chemical Vapor Infiltration in a Microwave Heated Preform" (with Deepak), *J. American Ceramic Society*, vol. 76, pp. 1924-1929 (1993).
110. "Physical Modeling Studies of Electrolyte Flow Due to Gas Evolution and Some Aspects of Bubble Behavior in Advanced Hall Cells: Part I. Flow in Cells with a Flat Anode" (with R. Shekhar), *Met. Trans. B.*, vol. 25, pp. 333-340 (1994).
111. "Physical Modeling Studies of Electrolyte Flow Due to Gas Evolution and Some Aspects of Bubble Behavior in Advanced Hall Cells: Part II. Flow and Interpolar Resistance in Cells with a Grooved Anode" (with R. Shekhar), *Met. Trans. B.*, vol. 25, pp. 341-347 (1994).
112. "Enhancement of Resistance Against Oxidation with Carbon Dioxide for Formed Coke and Electrode-Grade Graphite and Carbon by Infiltrating Carbon into Pores" (with Y. Shigeno), *ISIJ International*, vol. 33, pp. 721-727 (1993).
113. "Fluid Flow in Electrometallurgy", pp. 387-418 in *Advances in Transport Processes in Metallurgical Systems*, Vol. 4, Elsevier Science Publishers, Amsterdam (1992).
114. "Some Observations of the Effect of Porous Silicon on Oxidation-Induced Stacking Faults" (with S. Y. Shieh), *LBL Report #33485*, *J. Electrochem. Soc.*, vol. 140, pp. 1094-1096 (1993).
115. "Heat Transfer Phenomena in Lithium/Polymer-Electrolyte Batteries for Electric Vehicle Applications" (with Y. Chen), *LBL Report #33487*, *J. Electrochem. Soc.*, vol. 40, pp. 1833-1838 (1993).
116. "Some Preliminary Observations of the Rapid Thermal Oxidation of Porous Silicon, and the Rapid Thermal Nitriding of Oxidized Porous Silicon" (with S. Y. Shieh), *LBL Report #33486*, *J. Vac. Sci. and Tech.*, vol. 12, pp. 1422-1426 (1994).
117. "Thermal Analysis of Lithium Polymer Electrolyte Batteries by a Two-Dimensional Model - Thermal Behavior and Design Optimization" (with Y. Chen), *Electrochimica Acta*, vol. 39, pp. 517-526 (1994).
118. "Three-Dimensional Modeling of Lithium/Polymer Batteries Under Galvanostatic Discharge and Dynamic Power Profile" (with Y. Chen), *LBL Report #35364*, *J. Electrochem. Soc.*, vol. 141, pp. 2947-2955 (1994).
119. "The Stability of an Interface Between Viscous Fluids Subjected to a High-Frequency Magnetic Field and Consequences for Electromagnetic Casting" (with Deepak), *J. Fluid Mech.*, vol. 287, pp. 133-150 (1995).
120. "A Three-Dimensional Mathematical Model of Electromagnetic Casting and Testing

- Against a Physical Model, Part I. The Mathematical Model" (with D. P. Cook), Met. Trans. B., vol. 26B, pp. 1263-1270 (1995).
121. "A Three-Dimensional Mathematical Model of Electromagnetic Casting and Testing Against a Physical Model, Part II. Results From a Physical Model and Testing of the Mathematical Model" (with D. P. Cook and S. Nishioka), Met. Trans. B., vol. 26B, pp. 1271-1279 (1995).
  122. "Further Studies of a Zinc-Air Cell Employing a Packed Bed Anode, Part III. Improvements in Cell Design" (with J. C. Salas), LBL Report #34933, J. Appl. Electrochem., vol. 24, pp. 858-862 (1994).
  123. "High-Temperature Oxidation of Ti<sub>3</sub>Al-Nb Alloys" (with C. H. Koo and K. Y. Song), Oxidation of Metals, vol. 42, pp. 529-544 (1994).
  124. "Measurements of the Electrical Conductivity of Woods Alloys and Other Low Melting Point Alloys" (with A. Verma), Met. Trans. B., vol. 25B, pp. 937-939 (1994).
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