

FIONA M. DOYLE
Vice Provost for Graduate Studies and Dean of the Graduate Division
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Donald H. McLaughlin Professor of Mineral Engineering
Department of Materials Science and Engineering
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EDUCATION

B.A. Metallurgy and Materials Science, University of Cambridge, England, 1978
M.A. Natural Sciences, University of Cambridge, England, 1982
M.Sc. (Eng.) Extractive Metallurgy (awarded with Distinction), Imperial College of Science and Technology, University of London, England, 1979
Ph.D. Hydrometallurgy, Imperial College of Science and Technology, University of London, England, 1983. Thesis title: "Hydrolytic Stripping of Mixed Metal Carboxylates"
Diploma of Membership of Imperial College (D.I.C.) 1979 and 1983

PROFESSIONAL EXPERIENCE

1979-1982: Teaching Assistant, Imperial College of Science and Technology
1983: Graduate Trainee, Davy McKee, Metals and Minerals Division, Stockton-on-Tees, England
1983-1988: Assistant Professor, Department of Materials Science and Mineral Engineering, University of California, Berkeley
1988-1994: Associate Professor, Department of Materials Science and Mineral Engineering, University of California, Berkeley
1990 (Fall): Acting Associate Dean, Special Programs, College of Engineering, University of California, Berkeley
1994-present: Professor, Department of Materials Science and Engineering, University of California, Berkeley
2001-Aug 2002: Director, Institute for Environmental Science and Engineering, University of California, Berkeley (Acting Director July 2001-June 2002).
2002-2005: Chair, Department of Materials Science and Engineering, University of California, Berkeley
2005-2008: Associate Dean for Academic Affairs, College of Engineering, University of California, Berkeley
2006-July 2007: Acting Dean, College of Engineering, University of California, Berkeley
2005-2009: Executive Associate Dean, College of Engineering, University of California, Berkeley
2009-10: Vice Chair, Berkeley Division of the Academic Senate, University of California, Berkeley
2010-11: Chair, Berkeley Division of the Academic Senate, University of California, Berkeley
2011-2014: Executive Associate Dean, College of Engineering, University of California, Berkeley
2014: Interim Director, Jacobs Institute for Design Innovation, Univ. California, Berkeley
2015-present: Dean of the Graduate Division, University of California, Berkeley.

AWARDS AND HONORS

1993 Distinguished Lecturer in Hydrometallurgy, University of British Columbia, Vancouver, Canada.
Plenary Lecturer, XVI Encontro Nacional de Tratamento de Minérios e Hidrometalurgia, Rio de Janeiro, Brazil, September 1995.
National Institute for Resources and Environment, Agency of Industrial Science and Technology, MITI, Tsukuba, Japan, visiting fellowship, March 1996.
TMS Distinguished Service Award, 1998.
Donald H. McLaughlin Professor of Mineral Engineering, Department of Materials Science and Engineering, University of California, Berkeley, 1998-present
TMS Extraction and Processing Distinguished Lecturer, 2007
2012 Best Paper in Characterization of Minerals and Ceramics, TMS Materials Characterization Committee
Berkeley Faculty Service Award, Berkeley Division of the Academic Senate, 2013.
SME (Society for Mining, Metallurgy & Exploration) Milton E. Wadsworth Award, 2016 (for distinguished contributions advancing non-ferrous chemical metallurgy).
Member, National Academy of Engineering (Elected 2016).

PROFESSIONAL AFFILIATIONS

American Institute of Mining, Metallurgical and Petroleum Engineers:
The Minerals, Metals and Materials Society (TMS)
Society for Mining, Metallurgy, and Exploration, Inc. (SME)
Institution of Materials, Minerals and Mining
Chartered Engineer, Great Britain

PROFESSIONAL ACTIVITIES

Intramural (selected activities only)

Committee on Courses of Instruction, Academic Senate, University of California, Berkeley, 1989-1991, Chair, Aug. 1990-Dec. 1991.
Committee on Educational Policy, Academic Senate, University of California, Berkeley, 1992-1995.
Area Advisory Panel - Engineering, University of California, Berkeley, Spring 1993.
Search committee, Dean of the College of Engineering, University of California, Berkeley, 1995-1996.
Committee on Special Scholarships, Academic Senate, University of California, Berkeley, 1995-1999
Chair, Committee for Jane Lewis Fellowships in Mineral Engineering, 1997-2003
College of Engineering Strategic Planning Committee, 1997 and 1998-1999.
Lead PI, Berkeley Abandoned Mines Group, Earth Resources Center (1998-)
Chair, Advisory Board of Institute for Environmental Science and Engineering, University of California, Berkeley, 2000-2001
Chair, Faculty Search Committee, Department of Materials Science and Engineering, University of California, Berkeley, 2000-2002
Committee on Admissions, Enrollment and Preparatory Education, Academic Senate, University of California, Berkeley, (2000-2004)

University Welfare Committee, Academic Senate, University of California, Berkeley, 2004-2005
Graduate Council, Academic Senate, University of California, Berkeley, 2005-2006
Chancellor's Advisory Committee on Student Mental Health, University of California, Berkeley, 2006-2009.
Search committee, Vice Chancellor for Equity and Inclusion, University of California, Berkeley, 2006-07.
Search committee, University Registrar, University of California, Berkeley, 2007-08 (Chair).
Search committee, Dean of the College of Chemistry, University of California, Berkeley, 2007-08.
Task force on Enrollment, University of California, Berkeley, 2009-10.
Co-chair, Committee on Undergraduate Student Learning Initiative, University of California, Berkeley. 2009-11.
Chancellor's Advisory Committee on Intercollegiate Athletics Financial Sustainability, 2010.
Co-chair, University Athletics Board, 2010-2011.
Search committee, Vice Chancellor for Administration, University of California, Berkeley, 2010
Search committee, Chancellor, University of California, Berkeley, 2012
Steering committee, Accreditation Review by WASC (Western Association of Schools and Colleges), 2012-14.
Richmond Bay Campus Planning Committee, 2012-13.
Program Leader, Singapore-Berkeley Research Initiative for Sustainable Energy (SinBeRISE) 2013-2015.
Search Committee, Director, Center for Studies in Higher Education, UC Berkeley, 2013.
Search Committee, Director, Jacobs Institute for Design Innovation, UC Berkeley, 2013-14 (co-chair) and 2015.
Laboratory Operations & Safety Committee (2009-2017; chair 2014-2017).
Chancellor's Advisory Committee on Student Mental Health, co-chair, 2015-present.
Search Committee, Vice Chancellor for Research, University of California, Berkeley, 2015.
Search Committee, University of California Provost (Systemwide), 2017.
Co-PI, Mastercard Foundation Scholars Program, UC Berkeley, 2017-present.

Extramural

Member, Berkeley Mining Waste Study Team (Commissioned by California State Legislature), 1987-88.
Review Panels for National Science Foundation and Department of Energy
Member, Expert Panel for Non-Conventional Bioprocessing Long Term Research Initiative at Idaho National Engineering Laboratory, July 1992.
Member, Expert Panel on Acid Generation from Non-Coal Mining Wastes, U.S. Environmental Protection Agency, July 1992.
Facilitator, Technical Advisory Committee on Abandoned Mines, State Water Resources Control Board Review of Nonpoint Pollution Source Management in California, 1994.
Scientific Committee, Centro de Valorização de Recursos Minerais, Lisboa Codex, Portugal, 1998-2000.
Reviewer for National Science Foundation; Site Visit Team for Engineering Research Center for Particle Science and Technology at the University of Florida, Gainesville (1998-2000).
Member, National Materials Advisory Board, National Academies, May 2002-December 2007.
External Advisory Board, Department of Materials Science and Engineering, Cornell University (2006- 8)

- Chair, Materials Forum 2007, “Corrosion Education in the 21st Century, National Materials Advisory Board, March 30, 2007.
- External Review Committee (chair), Department of Chemical Engineering and Materials Science, University of Southern California, April 2007.
- National Academies study committee on Assessing Corrosion Education, 2007-2008
- External Review Committee (chair), Department of Materials Science and Engineering, University of Tennessee, Knoxville, April 2008.
- External Appraiser, MASc/MEng/PhD program in Chemical Engineering and Applied Chemistry at University of Toronto, for Ontario Council on Graduate Studies, January 2009.
- External Reviewer, Proposed BS program at Asia Institute of Technology, Bangkok, Thailand, June 2009.
- External Reviewer, Department of Materials Science and Engineering, University of Tennessee, Knoxville, April 2011.
- External Reviewer, University of Alberta China Institute, 2012.
- External Reviewer, Department of Metallurgical Engineering, University of British Columbia, 2012-13
- Member, ABET Academic Advisory Council, February 2013-2015.
- Invited international speaker, Royal Danish Academy of Sciences and Letters (Videnskabernes Selskab), Annual Meeting on Research Policy, March 25, 2014.
- Member, Scientific Advisory Committee, Energy Research Institute at Nanyang Technological University (ERI@N), Singapore, 2014.
- Member, Review Committee, Singapore National Academy of Sciences Young Scientist Award (Physical Sciences & Engineering), 2014.
- Member, External Advisory Board, Department of Materials Science & Engineering, University of California, Davis (2016-present).
- Member, National Academies Panel on Potential Human Health Effects of Surface Coal Mining Operations in Central Appalachia (2017-18).

Editorial Boards

- Editorial Board, Mineral Processing and Extractive Metallurgy Review (Co-editor, 1990-1998, Interim Editor-in-Chief, 1998-1999)
- Editorial Board, Hydrometallurgy (1986- 2010)
- Board of Review, Metallurgical Transactions B (1985-1991, 1994-1999, 1996 Chair)
- Editorial Board, International Journal of Mineral Processing (1999-2008)

Professional Society Activities

- TMS/SME Hydrometallurgy/Chem. Processing Committee (1986-1989) (1988-89 Chair)
- TMS Aqueous Processing Committee, (1988-1993) (1989-90 Chair)
- TMS/EPD Programming Chair (1992-95)
- TMS/EPD Executive Committee (1989-1995)
- TMS Copper, Nickel, Cobalt Committee (1989-2000)
- TMS Education and Professional Affairs Committee (1989-1995)
- TMS International Activities Committee (1991-1997)
- TMS Reactive Metals Committee (1989-2000)
- TMS Student Affairs Committee (1989- 92)

Fiona M. Doyle

TMS Nominating Committee (1992-94)
TMS/EPD Waste Treatment and Minimization Committee (1994-2000)
TMS Extraction and Processing Awards Committee (1994-1997, 1996-97 Chair)
SME Milton E. Wadsworth Award Committee (2002-2005; 2007-2010, 2017-present)
SME Information Publication Committee (2003-2006)
AIME Frank F. Aplan Award Committee (2006-2009, 2008-09 Chair)
ASM Int. International Materials Reviews Committee (2007-2010)
SME Arthur F. Taggart Award Committee (2010-2011)

Organized numerous technical sessions at meetings, and chair or member of organizing committees for:

Biotechnology in Minerals and Metal Processing, Society of Mining Engineers, 1989
Innov.in Materials Processing Using Aqueous, Colloid and Surface Chemistry, TMS, 1989
Western Regional Symposium on Mining and Mineral Processing Wastes, May-June, 1990, Berkeley, CA
Cleaner Environment '92, SME, 1992
Milton E. Wadsworth Symposium on Hydrometallurgy, August 1993, Salt Lake City, UT
First International Conference on Processing Materials for Properties, MMIJ-TMS, Hawaii, 1993
Electrochemistry in Mineral and Metal Processing IV, The Electrochemical Soc., Los Angeles, May 1996
Global Symposium on Recycling, Waste Treatment & Clean Technology, REWAS '99, San Sebastian, Sept. 1999.
Electrochemistry in Mineral and Metal Processing V, The Electrochemical Society, Toronto, May 2000
PMP 2000, Second International Conference on Processing Materials for Properties, MMIJ-TMS, San Francisco, CA, November 2000.
Electrochemistry in Mineral and Metal Processing VI, The Electrochemical Society, Paris, France, May 2003.
Chemical-Mechanical Polish (CMP) Planarization for ULSI Multilevel Interconnection (CMP-MIC) IX, Marina del Rey, CA, February 2004.
Chemical-Mechanical Polish (CMP) Planarization for ULSI Multilevel Interconnection (CMP-MIC) X, Fremont, CA, February 2005
Electrochemistry in Mineral and Metal Processing VII, The Electrochemical Society, Denver, CO, May 2006.
Jim Evans Honorary Symposium, TMS Annual Meeting, Seattle, WA, February 2010.
Electrochemistry in Mineral and Metal Processing VIII, The Electrochemical Society, Vancouver, Canada, April 2010.
Hydrometallurgy 2014, Met Soc of Canada (TMS representative, editor), Victoria, British Columbia, June 2014

Selected Consulting:

Placer Dome U.S., Inc., San Francisco, CA
Delphic Associates, Falls Church, VA
Committee to Save the Mokelumne/Sierra Club Legal Defense Fund (*pro bono*)
Idaho National Engineering Laboratory
Unocal, Los Angeles, CA

Forensic Management Associates, Inc, San Mateo, CA/Lempres and Wulfsberg, Oakland CA
BHP, San Francisco, CA
Alcoa Technical Center, Pittsburgh, PA
General Electric Company Corporate Research and Development, Schenectady, NY
CalFed Bank, San Francisco, CA
Rodel, Inc., Newark, DE
Rivkin Radler, New York, NY
Viacom

RESEARCH INTERESTS

Application of chemical thermodynamics, chemical and electrochemical kinetics, transport phenomena, colloid and interfacial science to develop a fundamental mechanistic understanding of minerals and materials processing operations and materials-solution interactions, with a goal of developing a foundation for ensuring sustainability and economic competitiveness in the supply of resources and energy.

STUDENTS AND SCHOLARS ADVISED

Graduate Students

- Niraj Ranjan, M.S., May 1985, "Mathematical modeling of zinc oxide leaching in dilute acid solutions"
- Didier Pouillon, M.S., December 1985, "Coextraction of base metals with iron during solvent extraction with carboxylic acid"
- Hernando Arauco, M.S., May 1986, "Hydrolysis and precipitation of iron during pressure leaching of zinc sulphide materials"
- Wumao Ye, Ph.D., December 1989, "Hydrothermal precipitation of zirconia powders from single and mixed Zr(IV) carboxylate solutions"
- Anna Marie Cook-Polek, M.S., May 1990, "Flow of decane through a natural fracture in siltstone; deviations from predicted behavior"
- Jung Hoon Yoon, M.S., May 1990, "Precipitation of yttrium and rare earth powders from aqueous solutions and emulsions"
- Saskia Duyvesteyn, M.S., May 1994, "Removal of trace metal ions from dilute solutions by ion flotation: cadmium-dodecylsulfate and copper-dodecylsulfate systems"
- Abbas Hussain Mirza, Ph.D., May 1994, "Kinetics and mechanisms of pyrite (FeS₂) oxidation in the formation of acid mine drainage"
- Donna Bodine, M.S., 1995, "Effect of oxidation on the removal of Cu²⁺, Cd²⁺ and Mn(VII) from dilute aqueous solutions by Upper Freeport bituminous coal"
- Ali S. Saleh, M.Eng., 1995 "Precipitation stripping of zinc-loaded D2EHPA using CO₂ sparging"
- Miguel N. Herrera, Ph.D., December 1994, "Further studies on the effects of oxidation on the surface properties of coal and coal pyrite"
- Alexandre Monteiro, Ph.D., May 1995, "Precipitation of alumina precursor powders using urea"
- Kandipati Sreenivasarao, Ph.D., December 1995, "Removal of toxic metals from dilute synthetic solutions by ion- and precipitate-flotation"

- Saskia Duyvesteyn, Ph.D., December 1997, “Adsorption of surfactants by a chelating resin: effects on floatability and metal loading”
- Yuchun Wang, Ph.D., September 1998, “Surface modification of polymeric membranes and silicon filters”
- Michelle Mathesen, M.S., May 1999, “In-situ prevention of acid mine drainage by pyrite encapsulation”
- Steven Kim, M.S., December 1999, “Investigation of gypsum and/or iron oxide coating on pyrite as a mechanism for in-situ prevention of acid mine drainage”
- Brad Bessinger, Ph.D., May 2000, “The geochemistry of gold, arsenic, and antimony in the Carlin-Type gold deposits and the mechanics of geologic fractures” (N.G.W. Cook posthumous co-chair)
- Claudia Villa Diniz, Ph.D., March 2000, “Remoção de metais pesados de solução de cloreto de manganês através de resina de troca iônica” (Virginia S.T. Ciminelli, co-chair)
- Joe D. Edington, M.S., May 2001, “Impact of comminution method on digestion behavior of bauxite”
- Autumn Fjeld, M.S., May 2001, “Stabilization of supported liquid membranes”
- Zhendong Liu, Ph.D., May 2001, “Removal of metal ions from dilute solutions by ion flotation”
- Nishi Nijhawan, M.S., Spring 2002, “The effect of salinity on the rate of pyrite oxidation” (Education Abroad exchange student from Imperial College of Science, Technology and Medicine, University of London)
- Serdar Aksu, Ph.D., Dec. 2002, “The Role of Complexing Agents in the Chemical Mechanical Planarization of Copper”
- William Ewing, M.S., May 2003, “Use of chelating ion exchange resins to remove copper from semiconductor processing waste solutions and recycle process water”
- Jennifer Haigh, M.S., Spring 2004, “Copper uptake on, and elution from, ion exchange resins”. (Education Abroad exchange student from Imperial College of Science, Technology and Medicine, University of London)
- Jeffrey Winterton, M.S., Dec. 2004, “Uptake and elution of copper on chelating ion exchange resins”
- Ling Wang, Ph.D., Dec. 2006, “Investigation of the Chemical and Electrochemical Phenomena in the Chemical Mechanical Planarization of Copper”
- Daniel Chapman, M.S., December 2006, “Synthesis of biocompatible films using polyelectrolyte multilayers”
- Christopher Lubeck, Ph.D., May 2007, “Synthesis and Characterization of Inorganic Materials Precipitated into Polymeric and Novel Liquid Crystalline Systems”
- Jeffrey Winterton, Ph.D., May 2008, “Development of a novel microfluidic reactor for highly controlled synthesis of semiconductor nanocrystals”
- Shantanu Tripathi, Ph.D., Dec 2008, “Tribo-chemical modeling of chemical mechanical planarization (CMP) of copper” (co-supervised with David Dornfeld, Mechanical Engineering).
- Hongxu Liu, M.S., May 2011, “Effects of thermal processing on crystallinity and dielectric properties of P(VDF-HFP) nanocomposites”
- Alyssa Maich, M.S., May 2012, “Characterization of magnetic and non-magnetic iron oxide nanoparticles synthesized by different routes”.
- Anh Pham Le Tuan, M.S./Ph.D, Dec. 2012, “ Activation of Hydrogen Peroxide by Iron-Containing Minerals and Catalysts in Circumneutral pH Solutions: Implications for *ex*

- situ* and *in situ* Treatment of Contaminated Water and Soil” (co-supervised with David Sedlak, Civil and Environmental Engineering)
- Seungchoun Choi, M.S./Ph.D., Dec. 2013, “ Physicochemical Modeling of Copper Chemical Mechanical Planarization (CMP) Considering Synergies in Removal Materials” (co-supervised with David Dornfeld, Mechanical Engineering).
- Yegan Erdem, Ph.D., May 2013, “Microfluidic reactors for the synthesis of nanoparticles” (co-supervised with Albert Pisano, Mechanical Engineering).
- Allison Engstrom, M.S/Ph.D., Dec. 2013, “Nanostructured electrochemical capacitors”
- Daniel Riffe, M.S., May 2014, “Electrowinning of rare earth metals from ionic liquids”
- Brent Dolan, Can Erdem, Zhou Lin, M.Eng. Capstone project (with David Dornfeld), “Life Cycle Assessment of NdFeB Rare Earth Magnet Recycling in Wind Turbines”, 2011-12
- Isabella Ikadara, Selin Kanyas, Tingting Liu, M.Eng. Capstone project (with David Dornfeld), “Recycling of Epoxy Resins”, 2012-13.
- Gary Ong, MS/Ph.D, “Nanostructured di-block copolymers in capacitors” (with Delia Milliron, Univ. Texas, Austin)
- Yanwei Lum, MS/Ph.D, “Anode materials for photoelectrochemical energy generation” (with Joel Ager, LBNL)

Undergraduates:

- Edward Kim, 1986-87, “Precipitation of zirconia by hydrolytic stripping”
- Lucia Feng, 1986-87, “Hydrolysis of iron during pressure leaching of zinc sulfide concentrates”
- Zeva Fong, 1986, “Hydrolysis of iron at elevated temperatures”
- Stephen Kim, 1996, “Detoxification of aqueous solutions using ion exchange resins”
- John Newberg, 1997-1998, Senior thesis in Environmental Sciences and Chemistry, “Ion flotation: predicting metal removal rates from surface tensions measurements”
- Abbas Hassan, 1997-1998, “Novel equipment for ion flotation”
- Sriram Kosuri, 1997-1998 “Bioremediation of metal-laden acid mine drainage”
- Andrea Renner, 1997-1998 “Bioremediation of metal-laden acid mine drainage”
- Michael Chin, 2002, “Functionalization of polymers to create inorganic/polymer hybrid materials
- Goretti W. Ngao, 2003, “Ion exchange of copper with Dowex M-4195”
- Fanny Darmawan, 2003-2004, “Regeneration of copper-loaded Dowex M-4195” and “Synthesis of conducting hexagonal phase liquid crystals”
- Michael Ho, 2005, “NMR and TEM characterization of liquid crystal systems”
- Christopher Lai, 2005, “Galvanic effects in chemical mechanical planarization”
- Danny Wu, 2006-07, “Electrochemical studies and AFM of copper CMP”
- Seo (Jake) Park, 2006-07, “Development of a microfluidic reactor for synthesizing nanoparticles”.
- Gye Hyun (Alan) Kim, 2008-09, “Synthesis of magnetic particles by hydrolytic stripping”.
- Carolyn T. Kwok, 2008-09, “Synthesis of magnetic particles by hydrolytic stripping”.
- Matthew Samuels, 2008-09, “Synthesis of magnetic particles by hydrolytic stripping”.
- Gagandeep Sidhu, 2012-13, “Electrodeposition of rare earth alloys from green solvents”
- Andrew Dussault, 2012-13, “Electrodeposition of rare earth alloys from green solvents”
- Akshita Dutta, 2012-13, “Vanadium oxide-based supercapacitors – electrochemical synthesis and characterization”
- Cesar Urbano, 2013-14, “Electrodeposition of rare earth alloys from organic solutions”
- Mark E. Zajac, 2014, “Electrodeposition of rare earth alloys from de-aerated ethanol solutions”

Sumit Ghosh, 2014, “Capacitance of nanostructured carbon materials synthesized from agricultural waste” (QUEST Scholar)

Postdoctoral Scholars:

Xiangzhi Liu, 1988-89, “Environmental effects of mining activities”

Yasuhiro Konishi, 1988-89, “Modeling of kinetics of hydrolysis and precipitation from organic solutions”

Jae-Chun Lee, 1990, “Precipitation of yttrium and lanthanum oxalates from di-2-ethylhexyl phosphoric acid”

Enriqueta Antico, 1992, “Modeling the solvent extraction of yttrium from chloride and nitrate solutions with di-2-ethyl hexyl phosphoric acid”

Mauricio Torem, 1995 “Flotation and extractive metallurgy of xenotime and zirconite concentrates”

Kazuya Koyama, 2006-07 “Synthesis of nanoparticulate CdSe”

Feng Xie, 2010-11 “Anodic oxidation of cyanide and thiocyanate during the electrolytic treatment of waste copper cyanide solutions”

Anahit Raygani, 2013-16, “Innovative processing routes for electrodeposition of rare earths and their alloys”

COURSES TAUGHT

Engineering 44/48/49: Energy and Non-renewable Resources (1985- 1989) (with N.G.W. Cook)

Mineral Engineering 260: Surface Properties of Materials (1993-2000)

Mineral Engineering 262: Surface Chemistry of Flotation (1992-1994)

Mineral Engineering 263: Applied Surface Phenomena (1995-1999)

Mineral Engineering 270: Advanced Hydrometallurgy (1984–1999)

Mineral Engineering 271: Electrochemistry in Minerals and Materials Processing (1986-1996)

Mineral Engineering 150: Mineral Engineering Laboratory (1984-1992)

Mineral Engineering 160: Introduction to Mineral Processing (1983-1985)

Mineral Engineering 190: Field trips (1987 & 1989)

Materials Science and Engineering 112: Corrosion (Chemical Properties), (1984-1985, 1996-2001)

Materials Science and Engineering 120: Materials Production (1986-1989; 2009-)

Materials Science and Eng. 161: Chemical Behavior of Minerals, Materials and Fluids (1995 and 1998)

Materials Science and Eng. 227: Solution Processing of Materials, Devices and Nanostructures (2001-4)

Materials Science and Engineering 260: Surface Properties of Materials (2003-5)

MSE 300: Supervised teaching of Materials Science and Engineering (2004-2011)

Nuclear Engineering 124: Nuclear Chemical Engineering (1995)

Engineering 92: Perspectives in Engineering (2008-2014)

PUBLICATIONS: JOURNALS, CONFERENCE PROCEEDINGS, ETC.

1. F.M. Doyle-Garner and A.J. Monhemius, "The hydrolytic stripping of Versatic acid solutions containing iron and other metals", *Minerals and Metallurgical Processing*, 2 (1985) pp. 47-51.
2. F.M. Doyle-Garner and A.J. Monhemius, "Mixed iron-nickel complexes in Versatic 10 solutions", *Hydrometallurgy*, 13 (1985) pp. 317-326.
3. F.M. Doyle-Garner and A.J. Monhemius, "Hydrolytic stripping of single and mixed metal-Versatic solutions", *Metallurgical Transactions B*, 16B, (1985) pp. 671-677.
4. E.A. Villegas and F.M. Doyle-Garner "Formation of bimetallic complexes in solvent extraction with carboxylic acids - studied by infrared spectrophotometry" *Anais do XI Encontro Nacional de Tratamento* in October 1985, Natal, Brazil, Vol. 2, pp. 312-326.
5. F.M. Doyle, "Solvent Extraction. Principles and Applications to Process Metallurgy, Part 1", (Book Review), *International Journal of Mineral Processing*, 16 (1986) pp.299-306.
6. H. Arauco and F.M. Doyle, "Hydrolysis and precipitation of iron during acid pressure leaching of zinc sulphide materials", in *Hydrometallurgical Reactor Design and Kinetics*, Eds. R.G. Bautista, R.J. Wesely, G.W. Warren, TMS-AIME, 1986, pp. 187-207.
7. N. Ranjan, F.M. Doyle and E. Peters, "Mathematical model for the leaching kinetics of zinc oxide in acid solutions", in *Hydrometallurgical Reactor Design and Kinetics*, Eds. R.G. Bautista, R.J. Wesely, G.W. Warren, TMS-AIME, 1986, pp. 49-65.
8. D. Pouillon, F.M. Doyle and E.A. Villegas, "Mixed-metal complexes formed during solvent extraction with carboxylic acids", *Proceedings ISEC '86, International Solvent Extraction Conference*, Munich, September, 1986, Vol. II, pp. 99-106.
9. H. Arauco and F.M. Doyle, "Hydrolysis and precipitation of iron during first stage pressure leaching of zinc sulphide concentrates", in *Iron Control in Hydrometallurgy*, (Proceedings of the International Symposium on Iron Control in Hydrometallurgy, Toronto, October 1986) Eds. J.E. Dutrizac and A.J. Monhemius, Ellis Horwood, Chichester, England, pp. 409-430, 1986.
10. F.M. Doyle and James S. Hanson, "Proceedings of the International Symposium on Electrochemistry in Mineral and Metal Processing", (Book Review), *International Journal of Mineral Processing*, 17 (1986) pp. 317-320.
11. F.M. Doyle, N. Ranjan and E. Peters, "Mathematical modeling of zinc oxide leaching in dilute solutions", *Transactions of the Institution of Mining and Metallurgy*, 96, (1987), pp. C69-78.
12. Fiona M. Doyle and Wumao Ye, "ZrO₂ powders from zirconium (IV) carboxylates", *Journal of Metals*, 39 (7) July 1987, pp. 34-37.

13. F.M. Doyle, "Hydrometallurgical Extraction and Reclamation", (Book Review), *AIChE Journal*, **33** (1987) p. 1580.
14. D. Pouillon and F.M. Doyle, "Software for computation of aqueous phase species distributions and solvent extraction with liquid cation exchangers", *Metallurgical Transactions B*, 18B, (1987) pp. 743-746.
15. D. Pouillon and F.M. Doyle, "Solvent extraction of metals with carboxylic acids - theoretical analysis of extraction behaviour", *Hydrometallurgy*, 19 (1988) pp. 269-288.
16. F.M. Doyle, D. Pouillon and E.A. Villegas, "Solvent extraction of metals with carboxylic acids - coextraction of base metals with Fe(III) and characterization of selected carboxylate complexes", *Hydrometallurgy*, 19 (1988) pp. 289-308.
17. F.M. Doyle, "The physical chemistry of the precipitation stripping process for removing iron (III) from carboxylate solutions with dilute sulphuric acid", *Hydrometallurgy*, 20 (1988) pp. 65-85.
18. F.M. Doyle, "Extraction Metallurgy 85", (Book Review), *International Journal of Mineral Processing*, 23 (1988), pp. 157-159.
19. F.M. Doyle, "Recent developments in hydrometallurgy", *Journal of Metals*, 40 (4) April 1988, pp. 32-38.
20. M. Hood, J.P. Dwyer, F.M. Doyle, T.N. Narasimhan, A.J. Horne et al., "Mining Waste Study Final Report", Prepared for *California State Legislature*, July 1, 1988.
21. Ernest Peters and Fiona M. Doyle, "Leaching and decomposition of sulfide minerals", in *Challenges in Mineral Processing*, Eds. K.V.S. Sastry, M.C. Fuerstenau, Society of Mining Engineers, Littleton, CO, 1989, pp. 509-526.
22. Jung Hoon Yoon and Fiona M. Doyle, "Precipitation of rare-earth powders from aqueous solutions and emulsions", in *Innovations in Materials Processing Using Aqueous, Colloid and Surface Chemistry*, Eds. F.M. Doyle, S. Raghavan, P. Somasundaran and G.W. Warren, TMS, Warrendale, PA 1989 pp.195-212.
23. F.M. Doyle, S. Raghavan, P. Somasundaran and G.W. Warren (Eds.) *Innovations in Materials Processing Using Aqueous, Colloid and Surface Chemistry*, TMS, Warrendale, PA 1989.
24. B.J. Scheiner, Fiona M. Doyle and S.K. Kawatra (Eds.) *Biotechnology in Minerals and Metal Processing*, Society of Mining Engineers, Littleton, CO, 1989.
25. F.M. Doyle, H. Arauco, and L.M. Feng, "Iron removal during oxidative, acid pressure leaching of a zinc sulphide concentrate", *International Journal of Mineral Processing*, 25 (1989) pp. 241-260.

26. F.M. Doyle, "Aqueous processing of minerals and materials", *J.O.M.*, 41 (4) (1989) pp. 51-58.
27. F.M. Doyle, "Hydrometallurgical processing", *Mining Engineering*, 41 (5) (1989) pp. 346-347.
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