ED MATHEZ
EMPLOYMENT CURATOR
DEPARTMENT OF EARTH AND PLANETARY SCIENCES
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HIGHEST DEGREE EARNED
Ph.D.

AREA OF SPECIALIZATION
Geochemistry of volatile elements in mafic and ultramafic systems, evolution of layered intrusions, thermodynamics of sulfide systems, geochemistry of the platinum group elements, mantle petrology, the geochemistry of carbon, surface chemistry.

EDUCATIONAL EXPERIENCE
Ph.D. (Geology)University of Washington, Seattle, WA, 1981
M.S. (Geology) University of Arizona, Tucson, AZ, 1971
B.A. (Geology) Franklin and Marshall College, Lancaster, PA, 1968

PREVIOUS EXPERIENCE IN DOCTORAL EDUCATION
FACULTY APPOINTMENTS
Adjunct Research and Adjunct Senior Research Scientist, Lamont Doherty Earth Observatory, Columbia University (l989-present)
Visiting Professor, Geologic Museum, University of Copenhagen (2000-0I)
Chercheur Associe (1986-1987), Labo. des Isotopes Stables, Universite de Paris VI et VII.
Research Assistant Professor (1983-1987) and Geologist (1973-1983), Department of Geological Sciences, University of Washington.
Exploration Geologist (1967-1968, summers), The New Jersey Zinc Company, Grand Marais Minnesota. Geologic mapping and geophysical exploration, Duluth Complex.

GRADUATE ADVISEES
D. Nicholson
C. Peach
R. Hutchinson
R. Fogel
R. Kinzler
G. Amason,
J. Grecco
S. Mey
A. Mondal
Merlini
VanTongeren

RESEARCH GRANT SUPPORT

FEDERAL SOURCES

Investigations of the geochemical evolution of the Stillwater Complex and origin of platinum group element deposits from analysis of lead isotopes, USGS grant, 2005-2006, $46,000 (principal Investigator).

Collaborative research: Deposition of carbon on newly-formed fracture surfaces and its influence on deformation and electrical properties of rocks, NSF grant, 12/I/03-11/30/05, $76,760 (Principal Investigator).

Geochemical and petrologic evolution of chromitites and other platinum group element-rich rocks from study of the UG2layer, Bushveld Complex, NSF grant, 7/1/01-6/30/04, $170,709, (Principal Investigator).

Influence of carbon on the electrical properties of crustal rocks, DOE grant, 7/I/98--6/30/02, $184,984 (Principal Investigator).

Acquisition of a new scanning electron microscope and energy dispersive spectrometry system at the American Museum of Natural History, NSF grant, 9/1/97-8/31/99, $374,430 (Co-Principal Investigator).

Chlorine in mafic and intermediate melts and associated fluids: An experimental study, NSF, 1/1/96-12/31/98, $126,595 (Co-Principal Investigator).

Acquisition of a new electron microprobe, NSF grant, 9/1/95-8/31/97, $400,000 (Co-Principal Investigator).

Metasomatic processes and platinum group element deposits in layered intrusions, NSF grant, 2/1/94-7/31/97, $104,200 (Principal Investigator).

The Role of Carbon and Temperature in Determining Electrical Conductivity of Basins, Crust and Mantle, DOE grant, 7/1/92-6/30/95, $127,148 (Principal Investigator).

Distribution of the Platinum Group Elements between Sulfide and Silicate Melts, NSF grant, 1/15/91-6/30/93, $74,883 (Principal Investigator).

Mantle Oxidation State and the Solubility of Oxygen in Diamond, NSF grant, 6/1/89-5/31/92, $57,600 (Principal Investigator).

Platinum Group Elements in Layered Intrusions and Submarine Glasses, NSF grant, 3/1/88-8/31/90, $51,878 (Principal Investigator).

Geochemistry of Carbon in Mantle Rocks, NSF grant, 3/1/85-8/31/87, $82,100 (Principal Investigator).

Carbon, Fluids, and the Genesis of Platinum Ores in the Stillwater Complex, NSF grant, 11/15/84-4/30/87, $66,747 (Principal Investigator).

Acquisition of an Electron Microprobe, NSF grant, 6/1/84-12/1/85, $200,000 (Co-Principal Investigator).

Geochemistry of Carbon in Submarine Basalts and Peridotite Nodules, NSF grant, 11/1/81-4/30/84, $94,907 (Co-Principal Investigator).

The effect of carbon on the mechanical and electrical properties of rocks, DOE grant, 7/1/95-6/30/98, $226,095 (Principal Investigator).

Sulfur and Carbon in Mafic Systems, NSF grant, *7/1178-1211181,* $61,200 (Co-Investigator).

NON-FEDERAL SOURCES

Experimental Study of Oxygen, Nitrogen and Hydrogen Solubility in Diamond and Silicates at High Pressure and Temperatures, Los Alamos National Laboratory, 10/1/88-9/30/91 (Collaborator).

The Bushveld Pipes, University of Washington Graduate School Research Fund, 7/1/85-6/30/86, $5,332 (Principal Investigator).

RECENT ARTICLES IN REFEREED JOURNALS

Mondal, S.K., and E.A Mathez, 2007, Origin of the UG2 chromitite layer, Bushveld Complex. *Journal ofPetrology* 48, 495-510.

Mathez, E.A., and J.L. Mey, 2005, Character of the UG2 chromitite and host rocks and petrogenesis of its pegmatoidal footwall, northeastern Bushveld Complex. Economic Geology 100, 1617-1630.

Mathez, E.A., 2005, Cold fire. Natural History, 114 (6), 26-31.

Mathez, E.A., 2004, A birthstone for Earth. Natural History, 113 *(May), 40-45.*

Grieco G, A Ferrario, and E.A. Mathez, 2004, The effect of metasomatism on the Cr-PGE mineralization in the Finero Complex, Ivrea-Verbano Zone, Southern Alps. Ore Geology Reviews, 24, 299-314.

Mathez E.A, and J.D. Webster, 2004, Partitioning behavior of chlorine and fluorine in the system apatite-silicate melt-fluid. Geochim. Cosmochim. Acta 69, 1275-1286.

Mathez, E.A, and J.D. Webster, 2004, *The Earth Machine: The Science ofa Dynamic Planet*. New York: Columbia University Press, 335p.

Chusi Li, E. M. Ripley, and E. A Mathez, 2003, Nickel partitioning between olivine and submarine basalt glass: Implications for partitioning behavior in S-bearing systems. Chemica!. Geology *201,295-306.*

Mathez, E.A and T.E. Waight, 2003, Lead isotopic disequilibrium between sulfide and plagioclase in the Bushveld Complex and the chemical evolution of large layered intrusions. Geochim. Cosmochim. Acta 67, 1875-1888.

Duba, AG., E.A Mathez, and T.J. Shankland, 2001, Workshop addresses crustal carbon and its effect on electrical conductivity. EOS 82, 456.

Grieco, G., A. Ferrario, A von Quadt, V. Koeppel, and E.A Mathez, 2001, The zircon bearing chromitites of the pWogopite peridotite ofFinero (Ivrea Zone, southern Alps): Evidence and geochronology of a metasomatized mantle slab. I Petro!. 42, 89-101.

Mathez, E.A (ed.), 2001, *Earth: Inside and Out.* The New Press, New York, 238pp.

Delaney, IR., D.S. Kelley, B.A. Mathez, D.R. Yoerger, J. Baross, and M.O. Schrenk,

M.K. Tivey, I Kaye, and V. Robigou, 2001, "Edifice Rex" Sulfide Recovery Project: Analysis of submarine hydrothermal microbial habitat. EOS 82, 67-73.

Mathez, E.A., ID. Webster, R. Kinzler, and H. Sloan, 2000, Exhibit created by scientists brings planet earth to public. EOS 81,341-342.

Mogk, D.W., and E.A Mathez, 2000, Carbonaceous films in mid-crustal rocks from the KTB borehole, Germany, as characterized by time-of-flight secondary ion mass spectrometry. Geochemistry Geophysics Geosystems 1, paper 2000GC000081.

Mathez. E.A, 1999, On factors controlling the concentrations of platinum group elements in layered intrusions and chromitites. *In,* R.R. Keays, C.M. Lesher, P.C. Lightfoot, and C.E.G. Farrow, eds, Dynamic processes in magmatic ore deposits

and their application in mineral exploration. Geological Association of Canada, Short Course Volume 13, 251-285.

Roberts, J.J., AG. Duba, E.A Mathez, T.l Shankland, and R Kinzler, 1999, Carbon-enhanced electrical conductivity during fracture of rocks. 1 Geophys. Res. *104,737*-747.

Webster, lD., R.J. Kinzler, and E.A Mathez, 1999, Chloride and water solubility in basalt and andesite liquids and implications for magmatic degassing. Geochim. Cosmochim. Acta 63, 729-738.

Mathez, E.A, and D.M. Mogk, 1998, Characterization of carbon compounds on a pyroxene surface from a gabbro xenolith in basalt by time-of-flight secondary ion mass spectrometry. Am. Mineral. 83, 918-924.

Mathez, E.A, R.H. Hunter, and R. Kinzler, 1997, Petrologic evolution of partially molten cumulate: The Atok section of the Busvheld complex. Contrib. Mineral. Petrol. 129, 20-34.

Shankland, T.l, AG. Duba, E.A Mathez, and C.L.Peach, 1997, Increase of electrical conductivity with pressure as an indicator of conduction through a solid phase in midcrustal rocks. 1 Geophys. Res. *102, 14,741-14,750.*

Leger, A, E.A. Mathez, A Duba, F. Pineau, and S. Ginsberg, 1996, Carbonaceous material in metamorphosed carbonate rocks from the Waits River Formation, NE Vermont, and its effect on electrcial conductivity. 1 Geophys. Res. 101,22,203-22,214.

Peach, C.L., and E.A Mathez, 1996, Constraints on the formation of platinum group element deposits in igneous rocks. Econ. Geol. 91, 439-450.

Mathez, E.A, RA. Fogel, LD. Hutcheon, and V.K. Marshintsev, 1995, Carbon isotopic composition and origin of SiC from kimberlites ofYakutiya. Geochim. Cosmochim. Acta 59,781-791.

Mathez. E.A, 1995, Magmatic metasomatism and formation of the Merensky reef, Bushveld Complex. Contrib. Mineral. Petrol. *119, 277-286.*

Mathez. E.A, AG. Duba, c.L. Peach, T.J. Shankland, and G. Plafker, 1995, Electrical conductivity and carbon in metamorphic rocks of the Yukon-Tanana Terrane, Alaska. 1 Geophys. Res. *100, 10,187-10,196.*

Mathez, E.A., P. Agrinier, and RB. Hutchinson, 1994, Hydrogen isotopic composition of the Merensky reef and related rocks, Atok section, Bushveld complex. Economic Geology 89, 791-802.

Peach, C.L., E.A Mathez, RR Keays, and S.l Reeves, 1994, Experimentally determined sulfide melt--silicate melt partition coefficients for iridium and palladium. Chemical Geology 117, 361-377.

Peach, C.L., and E.A Mathez, 1993, Sulfide melt--silicate melt partition coefficients for nickel and iron and implications for partitioning of other chalcophile elements. Geochim. Cosmchim. Acta 57,3013-3021.

Marcantonio, A Zindler, F., L. Reisberg, and E.A Mathez, 1993, Re-Os isotopic systematics in chromitite from the Stillwater Complex. Geochim. Cosmochim. Acta 57, 4029-4037.

Mathez, E.A., lD. B1acic C. Maggiore, T.E. Mitchell, and RA. Fogel, 1993, The determination of the 0 content of diamond by microactivation. Am. Mineral. 78, 753-761.

Mathez, E.A (ed.), 1991, *Encyclopedia ofGemstones and Minerals.* Michael Friedman Pub!., Inc., 303p.

Nicholson, D.M., and E.AMathez, 1991, Petrogenesis of the Merensky Reef in the Rustenburg section of the Bushveld Complex. Contrib. Mineral. Petrol. *107, 293-309.*

Tingle, T.N., E.A Mathez and M. Hochella, 1991, Carbonaceous matter in peridotites and basalts studied by XPS, SALI and LEED. Geochim. Cosmochim. Acta 55,1345-1352.

Peach, C.L., E.A Mathez, and RR Keays, 1990, Sulfide melt--silicate melt distribution coefficients for noble metals and other chalcophile elements as deduced from MORB: Implications for partial melting. Geochim. Cosmochim. Acta 54, 3379-3389.

Pineau, F., and E.A Mathez, 1990, Carbon Isotopes in Xenoliths from the Hualalai Voleano, Hawaii, and the generation ofisotopic variability. Geochim. Cosmochim. Acta 54,217-227.

Maggiore, C.l, lD. Blacic, G. Blondiaux, 11.. Debrun, M. Hage Ali, E.A Mathez, M.A. Misdaq, and M. Valladon, 1989, Channeling and Microactivation of Materials. Nuclear Inst. Meth. *B40/41, 1193-1195.*

Mathez, E.A, 1989, The nature of vapor associated with mafic magma and controls on its composition. *In,* Ore Deposition Associated with Magmas (I.A Whitney and A 1 Naldrett, eds.). Reviews in Economic Geology 4, 21-31.

Mathez, E.A, 1989, Interactions involving fluids in the Stillwater and Bushveld Complexes: Observations from the rocks. *In,* Ore Deposition Associated with Magmas (lA. Whitney and A 1 Naldrett, eds.). Reviews in Economic Geology 4, 167-179.

Mathez, E.A., and C.L. Peach, 1989, The geochemistry of the platinum-group-elements in mafic and ultramafic rocks. *In,* Ore Deposition Associated with Magmas (lA. Whitney and A. 1 Naldrett, eds.). Reviews in Economic Geology 4, 33-43.

Mathez, E.A, VJ. Dietrich, lR. Holloway, and AE. Boudreau, 1989, Carbon distribution in the Stillwater Complex and evolution of vapor during crystallization of Stillwater and Bushveld magmas. *I.* Petrol. *30, 153-173.*

Mathez, E.A., 1987, Carbonaceous matter in mantle xenoliths: Composition and relevance to the isotopes. Geochim. Cosmochim. Acta 51,2339-2347.

Mathez, E.A., lD. Blacic, *I.* Beery, C. Maggiore and M. Hollander, 1987, Carbon in olivine: Results from nuclear reaction analysis. *I.* Geophys. Res. 92, 3500-3506.

Boudreau, AE., E.A Mathez and I.S. McCallum, 1986, Halogen geochemistry of the Stillwater and Bushveld complexes: Evidence for transport of the platinum group elements by Cl-rich fluids. 1 Petrol. 27, 967-986.

McCallum, I.S., L.D. Raedeke, E.A Mathez and L.l Criscenti, 1985, A traverse through the Banded Series in the Contact Mountain area. Montana Bureau of Mines and Geology Sp. Pub. 92,293-304.

Raedeke, L.D., I.S. McCallum, E.A Mathez and LJ. Criscenti, 1985, The Contact Mountain section of the Stillwater Complex. Montana Bureau of Mines and Geology Sp. Pub. 92, 286-292.

Mathez, E.A., 1984, Influence of degassing on oxidation states ofbasaltic magmas. Nature 310,371-375.

Mathez, E.A V.l Dietrich and AI. Irving, 1984, The geochemistry ofcarbon in mantle peridotites. Geochim. Cosmochim. Acta 48, 1849-1859.
Mathez, E.A, lD. Blacic, *I.* Beery, C. Maggoire and M. Hollander, 1984, Carbon abundances in mantle minerals determined by nuclear reaction analysis. Geophys. Res. Lett. *n, 947-950.*
Mathez, E.A., 1981, The geochemistry of sulfur and carbon in basaltic melts. Ph.D. Dissertation, University ofWashington, 133 p.
Mathez, E.A. and 1.R. Delaney, 1981, The nature and distribution of carbon in submarine basalts and peridotite nodules. Earth Planet. Sci. Lett. 56, 217-232.
McCallum, I.S., L.D. Raedeke and E.A. Mathez, 1980, Investigations ofthe Stillwater Complex: Part 1. Stratigraphy and structure of the banded zone. Am. 1. Sci. *280A, 59*
Mathez, EA., 1979, Sulfide relations in Hole *418A* flows and sulfur contents of glasses. Initial Rep. ofthe Deep Sea Drilling Project, 53, U.S. Gov't Printing Office, Washington, D.C., 1069-1085.
Mathez, E.A., B.D. Nathan and G.B. Morey, 1977, Geologic map of the Hungry Jack Lake quadrangle, Cook County, Minnesota. Minnesota Geol. Survey Misc. Map *M-39.*
Mathez, E.A. and R.S. Yeats, 1976, Magmatic sulfides in basalt glass from DSDP Hole *319A* and Site 320, Nazca Plate. Initial Rep. of the Deep Sea Drilling Project 34, U.S. Gov't. Printing Office, Washington, D.C., 363-373.
Mathez, E.A., 1976, Sulfur solubility and magmatic sulfides in submarine basalt glass. 1. Geophys. Res. 81, 4269-4276.
Yeats, R.S. and E.A. Mathez, 1976, Decorated vesicles in deep-sea basalt glass, Eastern Pacific. 1. Geophys. Res. 81, 4277-4284.
McCallum, I.S. and EA. Mathez, 1975, Petrology ofnoritic cumulates and a partial melting model for the genesis of Fra Mauro basalt. Proc. Lunar Sci. Conf. *6th, 395-414.*
McCallum, I.S., E.A. Mathez, F.P. Okamura and S. Ghose, 1974, Petrology and crystal chemistry of poikilitic anorthositic gabbro 77017. Proc. Lunar Sci. Conf. *5th, 287-302.*
Mathez, E.A., 1973, Refinement of the Kudo-Weill plagioclase thermometer and its application to basaltic rocks. Contrib. Mineral. Petrol. 41,61-72.
Weiblen, P.W., E.A. Mathez and G.B. Morey, 1972, Logan intrusions: In Minnesota Geology. A Centennial Volume, P.K. Sims and G.B. Morey, ed., Minn. Geol. Survey, 394-406.

SPECIAL RECOGNITION/AWARDS

Fellow, MSA (elected 1996)
AGU Excellence in Geophysical Education Award, 2002 (co-recipient)