

CURRICULUM VITAE

Meenakshi Wadhwa

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- Education: Washington University, St. Louis; Ph.D. in Earth and Planetary Sciences, May 1994
Panjab University, India; M.S. with Honors, Geology, June 1989
Panjab University, India; B.S. with Honors, Geology, June 1988
(minors in Physics and Chemistry)
- Current Positions: Professor of Geological Sciences, School of Earth and Space Exploration, Arizona State University, October 2006-present
Director, Center for Meteorite Studies, Arizona State University, October 2006-present
Research Associate, The Field Museum, Chicago, October 2006-present
- Past Appointments: Curator, The Field Museum, Chicago, March 2005-September 2006
Lecturer and Senior Research Associate, University of Chicago, December 2003-September 2006
Adjunct Associate Professor, University of Illinois at Chicago, January 2002-September 2006
Associate Curator, The Field Museum, Chicago, July 1999-March 2005
Lecturer and Research Scientist, University of Chicago, January 1997-December 2003
Assistant Curator, The Field Museum, Chicago, June 1995-June 1999
Visiting Scholar, University of Chicago, June, 1995-December 1996
Postdoctoral Research Geochemist, University of California at San Diego, June 1994-May 1995
- Honors and Awards: Fellow, Wings WorldQuest, 2007
Fellow, Meteoritical Society, 2006
Guggenheim Fellowship, 2005-2006
Wings WorldQuest Air and Space Award, 2003
Nier Prize of the Meteoritical Society, 2000
Asteroid 8356 (discoverers C. S. Shoemaker and E. M. Shoemaker) named (8356) *Wadhwa* by International Astronomical Union, 1999
Antarctica Service Medal, 1993
McDonnell Fellowship, 1990-1992
University Fellowship, Washington University, 1989-1990
University Grants Commission Fellowship, Panjab University, 1988-1989
Gold Medal for ranking 1st in B.S. in Geology, Panjab University, 1988

Service and Committees: Member, NASA Discovery and Scout Mission Capabilities Expansion Review Panel, 2008
Member, Science Steering Committee, 5th Astrobiology Science Conference, 2007-2008
Member, NASA Origins of Solar Systems Review Panel, 2007
Co-Chair, Planetary Conditions for Life sub-panel, NASA Exobiology Review Panel, 2007
Member, Program Committee, 70th Annual Meteoritical Society Meeting, 2007
Member, Organizing Committee, Early Planetary Differentiation Workshop, 2006
Member, National Academies NRC Committee on Astrobiology Strategy for the Exploration of Mars, 2006-present
Member, National Academies NRC Committee on Origins and Evolution of Life, 2005-present
Member, NASA Cosmochemistry Program Management Operations Working Group, 2005-present
Member, NASA Solar System Exploration Strategic Roadmap Committee, 2005
Member, Program Committee, 68th Annual Meteoritical Society Meeting, 2005
Member, Solar System Exploration Subcommittee of NASA's Space Sciences Advisory Committee, 2004-2005
Member, Editorial Committee, *Meteorites and the Early Solar System II* (University of Arizona Press), 2004-2005
Member, NASA Mars-Moon Science Linkages (MMSL) Science Steering Group, 2004
Member, Organizing Committee, Oxygen in the Terrestrial Planets Workshop, 2004
Member, Universities Space Research Association (USRA) Lunar and Planetary Institute Science Council, 2002-2008
Member, NASA Curation and Planning Team for Extraterrestrial Materials (CAPTEM), 2002-2005
Panel Chief, NASA Cosmochemistry Review Panel, 2002-2003
Member, Meteoritical Society Council, 2001-2004
Member, Organizing Committee, Workshop on Mercury: Space Environment, Surface, and Interior, 2001
Co-Chair, Organizing Committee, 63rd Annual Meteoritical Society Meeting, 2000
Panel Chief, NASA Planetary Instrument Definition and Development Program (PIDDP) Surface Instrumentation Review Panel, 1999
Member, NASA Cosmochemistry Management Operations Working Group/Ad Hoc Advisory Group, 1998-2001
Member, Program Committee, Lunar and Planetary Science Conference, 1998-1999
Member, NASA Cosmochemistry Review Panel, 1997-1999
(Group Chief, Experimental and Analytical Geochemistry Group, 1999)
Member, NASA Laboratory Instrumentation for the Analysis of Returned Samples (LIFARS) Program Definition Group, 1997-1998
Member, Meteorite Nomenclature Committee, 1996-2000
(Chair, Meteorite Nomenclature Committee, 1998)
Member, NASA-NSF-Smithsonian Meteorite Working Group, 1996-1999
Member, NASA Planetary Instrument Definition and Development Program (PIDDP) Surface Instrumentation Review Panel, 1996

Professional Societies: American Geophysical Union
Association of Women Geoscientists
Geochemical Society
Meteoritical Society
Sigma Xi

Mission Participation: Science team member, NASA Discovery mission (Genesis, D. Burnett, PI), 2005-2008
Science team member, NASA Discovery Phase A candidate mission (OSIRIS, M. Drake, PI), 2007
Science team member, Sample Analysis at Mars (P. Mahaffy, PI), NASA Mars Science Laboratory (MSL) mission to Mars (planned launch in 2009)

Teaching Experience: GLG598/485 “Cosmochemistry and Meteorites”, Arizona State University, Fall Semester, scheduled alternate years, 2007-present
GeoSci220 “Magmatism in the Early Solar System”, University of Chicago, Spring Quarter, scheduled alternate years, 1998-2006
PhySci110 “Environmental History of Earth”, University of Chicago, Winter Quarter, 2001
Guest lectures in courses at University of Chicago and Northwestern University, 1996-present
“Life on Mars?”, Adler Planetarium and Field Museum joint-course, Summer 1997
“What We have Learned about Mars from Martian Meteorites”, Adler Planetarium course, Winter 1996
Field Museum Museology course for High School students, Summer 1996

Invited Talks: American Geophysical Union Fall Meeting, December 2007
Gordon Research Conference on Origins of Solar Systems, July 2007
Zinner Impact Symposium, Washington University, February 2007
Department of Earth and Planetary Sciences, University of New Mexico, December 2006
Department of Earth Sciences, ETH, Zurich, November 2006
Division of Geological Sciences, California Institute of Technology, April 2006
Department of Earth and Space Sciences, UCLA, April 2006
Department of Earth and Planetary Sciences, Washington University, March 2006
Department of Earth and Atmospheric Sciences, MIT, February 2006
Protostars and Planets V Conference, October 2005
15th Annual Goldschmidt Conference, May 2005
Woods Hole Oceanographic Institution Geodynamics Seminar, WHOI, April 2005
Max Planck Institut für Chemie, Mainz, Germany, April 2005
Department of Geophysical Sciences, University of Chicago, February 2005
Department of Earth and Environmental Sciences, University of Illinois at Chicago, February 2005
Department of Biological Sciences, Loyola University, September 2004
Oxygen in the Terrestrial Planets Workshop, July 2004
Harvard-Smithsonian Astrophysics of Planetary Systems Conference, Harvard University, May 2004
Iota Sigma Pi (National Honor Society of Women in Chemistry), Chicago Chapter, May 2004
Division of Geological and Planetary Sciences, California Institute of Technology, October 2003
Gordon Research Conference on Origins of Solar Systems, July 2003

Advanced Photon Source Colloquium, Argonne National Laboratory, May 2003
 Robert M. Walker Symposium, Washington University, February 2003
 Department of Geological Sciences, University of Illinois at Urbana-Champaign,
 September 2002
 American Geophysical Union Spring Meeting, May 2002
 Department of Geology, Northern Illinois University, March 2002
 American Geophysical Union Fall Meeting, December 2001
 Department of Mineral Sciences, American Museum of Natural History,
 November 2001
 Department of Geological Sciences, Rutgers University, November 2001
 Department of Earth and Atmospheric Sciences, MIT, October 2001
 Department of Geological Sciences, Indiana University, Bloomington, October
 2001
 Department of Geology, Southern Illinois University, Carbondale, September 2001
 Department of Astronomy, Cornell University, May 2001
 Earth Science Club of Northern Illinois, September 2000
 Max Planck Institut für Chemie, Mainz, Germany, February 2000
 Department of Geophysical Sciences, University of Chicago, January 2000
 Department of Chemistry, University of California at San Diego, December 1999
 State Microscopical Society of Illinois, Chicago, October 1999
 Department of Planetary Sciences, University of Arizona, Tucson, May 1999
 Department of Geophysical Sciences, University of Chicago, December 1998
 Department of Terrestrial Magnetism, Carnegie Institution of Washington,
 Washington DC, June 1998
 Sigma Xi Chapter at University of Illinois at Chicago, March 1998
 Department of Geological Sciences, University of Michigan, Ann Arbor, July 1997
 State Microscopical Society of Illinois, Chicago, July 1997
 Department of Astronomy, Northwestern University, Evanston, May 1997
 Department of Chemistry, University of California at San Diego, December 1996
 Department of Geology, Calvin College, Grand Rapids, October 1996
 Department of Geophysical Sciences, University of Chicago, October 1996
 Department of Geological Sciences, University of Illinois, Chicago, September
 1996
 Department of Geology, Northwestern University, Evanston, March 1996

- Graduate Students: Matthew Sanborn (ASU, Doctoral Student)
 Lev Spivak-Birndorf (ASU, Doctoral Student)
 Greg Brennecka (ASU Doctoral Student; co-supervised with A. Anbar)
- Dissertation Committees: Melissa Morris (ASU, Doctoral Student)
 Nicolas Ouellette (ASU, Doctoral Student)
 Karen Rieck (ASU, Masters Student)
 Dianne Taylor (UCLA, Doctoral Student)
 Liping Qin (U. Chicago, PhD 2007)
 David Cook (U. Chicago, PhD 2007)
 Agnes Markowski (ETH, Zurich, PhD 2006)
- Undergraduate Students: Lev Spivak-Birndorf (U. Chicago; Metcalf Intern and FM Intern, 2003-2005)
 Nicolas Beecher (U. Chicago; Metcalf Intern, 2002)
 Josef Dufek (U. Chicago; undergraduate intern, 2001)
 Noel Heim (U. Chicago; undergraduate honors thesis, 1999-2000)
 Shelley Erickson (FM Intern, 1998-1999)

Postdocs: Audrey Bouvier (2007-present)
Fang Zhen Teng (2006-2007)
Nicole Foley (2002-2004)
Nicolas Dauphas (2002-2004; co-supervised with A. M. Davis)

Research Interests: Understanding the formation and evolution of the Solar System and bodies within it through geochemical and isotopic studies of planetary materials (including meteorites and samples returned by spacecraft missions); time scales of accretion and differentiation of the terrestrial planets and planetesimals through high resolution chronometry based on short- and long-lived radionuclides; sources and distributions of extinct radionuclides (e.g., ^{26}Al , ^{53}Mn , ^{60}Fe) in the solar nebula and implications for conditions in the early solar system; processes in the solar protoplanetary disk and on planetesimals through investigation of mass dependent fractionations (e.g., in Mg, Fe, Ni, Zn) and non-mass dependent isotope anomalies (e.g., in Cr, Fe, Ni, Se) in primitive meteorites and their components; formation and evolution of crust-mantle reservoirs on Earth, Moon and Mars through isotopic and trace element studies; developing oxybarometers based on trace element and isotope systematics of redox-sensitive elements for understanding the redox evolution of silicate reservoirs on Earth and other terrestrial planets.

PUBLICATIONS

Peer-reviewed journal articles-

- R. P. Harvey, M. Wadhwa, H. Y. McSween, Jr., and G. Crozaz (1993) Petrography, mineral chemistry, and petrogenesis of Antarctic shergottite LEW88516. *Geochimica Cosmochimica Acta* **57**, 4769-4783.
- B. L. Jolliff, L. A. Haskin, R. O. Colson, and M. Wadhwa (1993) Partitioning of REE-saturating minerals: Theory, experiment, and modelling of whitlockite, apatite, and evolution of lunar residual magmas. *Geochimica Cosmochimica Acta* **57**, 4069-4094.
- M. Wadhwa, H. Y. McSween, Jr., and G. Crozaz (1994) Petrogenesis of shergottite meteorites inferred from trace and minor element microdistributions. *Geochimica Cosmochimica Acta* **58**, 4213-4229.
- M. Wadhwa and G. Crozaz (1995) Trace and minor elements in minerals in nakhlites and Chassigny: Clues to their petrogenesis. *Geochimica Cosmochimica Acta* **59**, 3629-3645.
- H. Y. McSween, Jr., D. D. Eisenhour, L. A. Taylor, M. Wadhwa, and G. Crozaz (1996) QUE94201 shergottite: Crystallization of a martian basaltic magma. *Geochimica Cosmochimica Acta* **60**, 4563-4569.
- M. Wadhwa and G. W. Lugmair (1996) The age of the eucrite Caldera from convergence of long- and short-lived chronometers. Letter to *Geochimica Cosmochimica Acta* **60**, 4889-4893.
- M. Wadhwa, E. K. Zinner, and G. Crozaz (1997) Manganese-chromium systematics of sulfides in unequilibrated enstatite chondrites. *Meteoritics and Planetary Science* **32**, 281-292.
- M. Wadhwa and G. Crozaz (1998) The igneous crystallization history of an ancient martian meteorite from rare earth element distributions. *Meteoritics and Planetary Science* **33**, 685-692.
- M. Wadhwa, G. Crozaz, L. A. Taylor, and H. Y. McSween, Jr. (1998) Martian basalt (shergottite) QUE94201 and lunar basalt 15555: A tale of two pyroxenes. *Meteoritics and Planetary Science* **33**, 321-328.
- T. J. McCoy, M. Wadhwa and K. Keil (1999) New lithologies in the Zagami martian meteorite: Evidence for fractional crystallization of a single magma unit on Mars. *Geochimica Cosmochimica Acta* **63**, 1249-1262.
- M. Wadhwa, G. A. McKay, and G. Crozaz (1999) Trace element distributions in Yamato 793605, a chip off the "Martian lherzolite" block. *Antarctic Meteorite Research* **12**, 168-182.
- M. Wadhwa and S. S. Russell (2000) Timescales of accretion and differentiation in the early solar system: The meteoritic evidence. *Protostars and Planets IV* (Eds. A. P. Boss, V. M. Manning and S. S. Russell), University of Arizona Press, Tucson, pp. 995-1018.
- G. Crozaz and M. Wadhwa (2001) The terrestrial alteration of Saharan shergottites Dar al Gani 476 and 489: A case study of weathering in a hot desert environment. *Geochimica Cosmochimica Acta* **65**, 971-977.
- M. Wadhwa (2001) Redox state of Mars' upper mantle and crust from Eu anomalies in shergottite pyroxenes. *Science* **291**, 1527-1530.

- M. Wadhwa, R. C. F. Lentz, H. Y. McSween, and G. Crozaz (2001) A petrologic and trace element study of Dar al Gani 476 and Dar al Gani 489: Twin meteorites with affinities to basaltic and lherzolithic shergottites. *Meteoritics and Planetary Science* **36**, 195-208.
- Ph. Gillet, J. A. Barrat, E. Deloule, M. Wadhwa, A. Jambon, V. Sautter, B. Devouard, D. Neuville, K. Benzerara, M. Lesourd (2002) Aqueous alteration in the Northwest Africa 817 (NWA 817) martian meteorite. *Earth and Planetary Science Letters* **203**, 431-444.
- G. Crozaz, C. Floss and M. Wadhwa (2003) Chemical alteration and REE mobilization in meteorites from hot and cold deserts. *Geochimica Cosmochimica Acta* **67**, 4727-4741.
- A. Galy, O. Yoffe, P.E. Janney, R. W. Williams, C. Cloquet, O. Alard, L. Halicz, M. Wadhwa, I. D. Hutcheon, E. Ramon, and J. Carignan (2003) Magnesium isotope heterogeneity of the isotopic standard SRM980 and new reference materials for magnesium-isotope-ratio measurements. *Journal of Analytical Atomic Spectrometry* **18**, 1352-1356.
- S. B. Simon, L. Grossman, R. N. Clayton, T. K. Mayeda, J. R. Schwade, P. P. Sipiera, J. F. Wacker, and M. Wadhwa (2003) The fall, recovery and classification of the Park Forest meteorite. *Meteoritics and Planetary Science* **39**, 625-634.
- M. Wadhwa, A. Shukolyukov, A. M. Davis, G. W. Lugmair, and D. W. Mittlefehldt (2003) Differentiation history of the mesosiderite parent body: Constraints from trace elements and manganese-chromium isotopic systematics of Vaca Muerta silicate clasts. *Geochimica Cosmochimica Acta* **67**, 5047-5069.
- N. Dauphas, P. E. Janney, R. Mendybaev, M. Wadhwa, F. M. Richter, A. M. Davis, Zuilan M., R. Hines, and C. N. Foley (2004) Chromatographic separation and MC-ICPMS analysis of iron. Investigating mass dependent and independent isotope effects. *Analytical Chemistry* **76**, 5855-5863.
- N. Dauphas, M. van Zuilen, M. Wadhwa, A. M. Davis, B. Marty, and P. E. Janney (2004) Clues from iron isotope variations on the origin of early Archean banded iron formations from Greenland. *Science* **306**, 2077-2080.
- M. Wadhwa, G. Crozaz, and J.-A. Barrat (2004) Trace element distributions in the Yamato 000593/000749 , NWA 817 and NWA 998 nakhlites: Implications for their petrogenesis and mantle source on Mars. *Antarctic Meteorite Research* **17**, 97-117.
- C. N. Foley, M. Wadhwa, L. E. Borg, P. E. Janney, R. Hines and T. L. Grove (2005) The early differentiation history of Mars from ^{182}W - ^{142}Nd isotope systematics in the SNC meteorites. *Geochimica Cosmochimica Acta* **69**, 4557-4571.
- P. Beck, J. A. Barrat, Ph. Gillet, M. Wadhwa, I. Franchi, R. C. Greenwood, M. Bohn, J. Cotten, B. van de Moortele, and B. Reynard (2006) Petrography and geochemistry of the chassignite Northwest Africa 2737 (NWA 2737), *Geochimica Cosmochimica Acta* **70**, 2127-2139.
- D. Cook, M. Wadhwa, P. Janney, N. Dauphas, R. N. Clayton, and A. M. Davis (2006) High precision measurements of non-mass dependent effects in nickel isotopes in meteoritic metal via multi-collector ICPMS. *Analytical Chemistry* **78**, 8477-8484.
- T. J. McCoy, R. A. Ketcham, L. Wilson, G. Benedix, M. Wadhwa, and A. M. Davis (2006) Formation of vesicles in asteroidal basaltic meteorites, *Earth and Planetary Science Letters* **246**, 102-108.
- M. Wadhwa, G. Srinivasan, and R. W. Carlson (2006) Time scales of planetesimal differentiation in the early

- solar system. In *Meteorites and the Early Solar System II* (Eds. D. Lauretta and H. Y. McSween, Jr.), University of Arizona Press, Tucson, pp. 715-731.
- D. Cook, M. Wadhwa, R. N. Clayton, N. Dauphas, P. Janney, and A. M. Davis (2007) Mass-dependent fractionation of nickel isotopes in meteoritic metal. *Meteoritics and Planetary Science* **42**, 2067-2077.
- N. Dauphas, M. van Zuilen, V. Busigny, A. Lepland, M. Wadhwa, and P. E. Janney (2007) Iron isotope, major and trace element characterization of early Archean supracrustal rocks from SW Greenland: protolith identification and metamorphic overprint. *Geochimica Cosmochimica Acta* **71**, 4745-4770.
- L. Qin, N. Dauphas, P. E. Janney, and M. Wadhwa (2007) Analytical developments for high-precision measurements of W isotopes in iron meteorites, *Analytical Chemistry* **79**, 3148-3154.
- F. Richter, P. Janney, R. Mendybaev, A. M. Davis and M. Wadhwa (2007) Elemental and isotopic fractionation of Type B CAI-like liquids by evaporation. *Geochimica Cosmochimica Acta* **71**, 5544-5564.
- F.-Z. Teng, M. Wadhwa, and R. Helz (2007) The absence of magnesium isotope fractionation during basalt differentiation: A case study from Kilauea Iki lava lake, Hawaii, USA. *Earth and Planetary Science Letters* **261**, 84-92.
- M. Wadhwa, Y. Amelin, A. M. Davis, G. W. Lugmair, B. Meyer, M. Gounelle, and S. Desch (2007) From dust to planetesimals: Implications for the solar protoplanetary disk from short lived radionuclides. *Protostars and Planets V* (Eds. B. Reipurth, D. Jewitt, and K. Keil), pp. 835-848.
- M. Wadhwa (2007) Long-lived chronometers. *Treatise on Geochemistry Vol. 1: Meteorites, Comets, and Planets* (Vol. Ed. A. M. Davis; Eds. in Chief H. D. Holland and K. K. Turekian), doi:10.1016/B978-008043751-4/00227-3.
- D. Cook, R. N. Clayton, M. Wadhwa, P. Janney, and A. M. Davis (2008) Nickel isotopic composition of troilite from iron meteorites. *Geophysical Research Letters* **35**, L01203, doi:10.1029/2007GL032431.
- L. Qin, N. Dauphas, M. Wadhwa, A. Markowski, R. Gallino, P. E. Janney, and C. Bouman (2008) Tungsten nuclear anomalies in planetesimal cores. *Astrophysical Journal* **674**, 1234-1241.
- M. Wadhwa (2008) Redox conditions on small bodies, the Moon and Mars. In *Oxygen in the Solar System* (Eds. G. MacPherson, D. W. Mittlefehldt, J. Jones), *Reviews in Mineralogy and Geochemistry* **68**, 493-510.
- N. Dauphas, D. Cook, A. Sacarabany, C. Fröhlich, A. M. Davis, M. Wadhwa, A. Pourmand, T. Rauscher, and R. Gallino (2008) Iron-60 evidence for early injection and efficient mixing of stellar debris in the protosolar nebula. *Astrophysical Journal*, in press.
- L. Qin, N. Dauphas, M. Wadhwa, J. Masarik, and P. E. Janney (2008) Rapid accretion and differentiation of iron meteorite parent bodies inferred from ^{182}Hf - ^{182}W chronometry and thermal modeling. *Earth and Planetary Science Letters*, in press.
- L. Spivak-Birndorf, M. Wadhwa, and P. E. Janney (2008) ^{26}Al - ^{26}Mg Systematics in D'Orbigny and Sahara 99555 Angrites: Implications for High-Resolution Chronology Using Extinct Chronometers *Geochimica Cosmochimica Acta*, submitted.
- M. Wadhwa, Y. Amelin, O. Bogdanovski, G. W. Lugmair, and P. E. Janney (2008) Ancient relative and absolute ages for a basaltic meteorite: Implications for time scales of planetesimal accretion and differentiation. *Geochimica Cosmochimica Acta*, submitted.

Conference abstracts-

- M. Wadhwa, H. Y. McSween, Jr., and G. Crozaz (1991) Trace element distributions in minerals of EETA79001: Clues to the petrogenesis of a unique shergottite. *Meteoritics* **26**, 404.
- A. El Goresy, M. Wadhwa, H.-J. Nagel, E. K. Zinner, J. Janicke and G. Crozaz (1992) ^{53}Cr - ^{53}Mn systematics of Mn-bearing sulfides in four enstatite chondrites. *Lunar and Planetary Science Conference XXIII*, 331-332.
- A. El Goresy, M. Wadhwa, E. K. Zinner, H.-J. Nagel, J. Janicke, and G. Crozaz (1992) Mn-Cr systematics in sphalerites and niningerites from Qingzhen and Yamato69001: Implications regarding their formation histories. *Meteoritics* **27**, 218.
- B. L. Jolliff and M. Wadhwa (1992) The distribution of rare earth elements between lunar apatite and whitlockite. *Lunar and Planetary Science Conference XXIII*, 625-626.
- M. Wadhwa and G. Crozaz (1992) REE in minerals in Nakhla and Lafayette: A comparative study of trace element microdistributions. *Lunar and Planetary Science Conference XXIII*, 1483-1484.
- M. Wadhwa and G. Crozaz (1992) Trace element characteristics of the new shergottite LEW88516. *Meteoritics* **27**, 302.
- M. Wadhwa and G. Crozaz (1992) Trace element microdistributions in the nakhlites: Implications for parent melt compositions. *Meteoritics* **27**, 302.
- M. Wadhwa and G. Crozaz (1993) Rare earth elements in individual minerals in shergottites. *Lunar and Planetary Science Conference XXIV*, 1473-1474.
- M. Wadhwa and G. Crozaz (1993) An ion microprobe study of trace element microdistributions in martian (?) igneous rocks (SNC meteorites). *Geological Society of America Abstracts with Programs* **25**, No. 6, A316.
- M. Wadhwa, T. J. McCoy, K. Keil, and G. Crozaz (1993) The chemical and physical evolution of late-stage melt in Zagami. *Meteoritics* **28**, 453.
- M. Wadhwa and G. Crozaz (1994) Rare earth element distributions in the Chassigny meteorite: Clues to its petrogenesis and relation to the nakhlites. *Lunar and Planetary Science Conference XXV*, 1451-1452.
- M. Wadhwa and G. Crozaz (1994) First evidence of infiltration metasomatism in a martian meteorite, ALH84001. *Meteoritics* **29**, 545.
- T. J. McCoy, M. Wadhwa, and K. Keil (1995) Zagami: Another new lithology and a complex near-surface magmatic history. *Lunar and Planetary Science Conference XXVI*, 925-926.
- M. Wadhwa and G. Crozaz (1995) Constraints on the rare earth element characteristics of metasomatizing fluids in the martian meteorite ALH84001. *Lunar and Planetary Science Conference XXVI*, 1451-1452.
- M. Wadhwa and G. W. Lugmair (1995) Sm-Nd systematics of the eucrite Chervony Kut. *Lunar and Planetary Science Conference XXVI*, 1453-1454.
- M. Wadhwa and G. W. Lugmair (1995) Samarium-neodymium and manganese-chromium systematics of the eucrite Caldera. *Meteoritics* **30**, 592.

- M. Wadhwa and Crozaz (1996) QUE94201: A new and different shergottite. *Lunar and Planetary Science Conference XXVII*, 1365-1366.
- M. Wadhwa and G. W. Lugmair (1996) The formation age of carbonates in ALH84001. *Meteoritics and Planet. Sci.* **31**, Suppl., A145.
- M. Wadhwa and A. M. Davis (1997) Effects of varying degrees of metamorphic equilibration on trace element distributions in three basaltic clasts from Vaca Muerta. *Lunar and Planetary Science Conference XXVIII*, 1483-1484.
- M. Wadhwa and G. W. Lugmair (1997) The controversy of young vs. old age of formation of carbonates in ALH84001. *Conference on Early Mars: Geologic and hydrologic evolution, physical and chemical environments, and the implications for life*, LPI Contribution Number 916, 79-80.
- M. Wadhwa, A. M. Davis, and D. W. Mittlefehldt (1997) Trace element distributions as indicators of magmatic vs. impact origin: A case study of three Vaca Muerta clasts. *Meteoritics and Planetary Science* **32**, Supp., A134.
- M. Wadhwa, G. A. McKay, and G. Crozaz (1997) Trace element distributions in Yamato 793605, a chip off the “Martian lherzolite” block. *National Institute of Polar Research 22nd Symposium on Antarctic Meteorites*, 197-199.
- M. Wadhwa, A. Shukolyukov, and G. W. Lugmair (1997) The relationship between basaltic clasts in mesosiderites and the HED meteorites: Clues from Mn-Cr systematics of two Vaca Muerta clasts. *Lunar and Planetary Science Conference XXVIII*, 1487-1488.
- M. Wadhwa, E. K. Zinner, and G. Crozaz (1997) Mn-Cr systematics in sulfides of unequilibrated enstatite chondrites: Parent body vs. nebular processing and implications for accretion times. *Workshop on parent body and nebular modification of chondritic materials*, LPI Technical Report Number 97-02, Part I, 62-63.
- M. Wadhwa, G. Crozaz, H. Y. McSween, Jr., and L. A. Taylor (1997) Martian basalt QUE94201 and lunar basalt 15555: A tale of two pyroxenes. *Lunar and Planetary Science Conference XXVIII*, 1485-1486.
- M. Wadhwa and A. M. Davis (1998) Vapor deposited mineral assemblages in vesicles of the eucrite Ibitira. *Lunar and Planetary Science Conference XXIX*, #1931.
- M. Wadhwa, A. Shukolyukov, and G. W. Lugmair (1998) ⁵³Mn-⁵³Cr systematics in Brachina: A record of one of the earliest phases of igneous activity on an asteroid. *Lunar and Planetary Science Conference XXIX*, #1480.
- M. Wadhwa, J. Zipfel, and A. M. Davis (1998) Constraints on the formation history of brachinites from rare earth element distributions. *Meteoritics and Planetary Science* **33**, Supp., A161.
- M. Wadhwa, M. K. Weisberg, G. Crozaz, and M. Prinz (1998) Did fayalites in the Kaba CV3 chondrite form in an asteroidal or a nebula environment?: Constraints from Mn-Cr systematics. *Lunar and Planetary Science Conference XXIX*, #1484.
- G. Crozaz and M. Wadhwa (1999) Chemical alteration of hot desert meteorites: The case of shergottite Dar al Gani 476. *Workshop on extraterrestrial materials from hot and cold deserts*, LPI Contribution No. 997, 25-27.
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