

Thursday, March 13, 2008

METEORITES FROM MARS: SHERGOTTITE AND NAKHLITE INVASION

8:30 a.m. Amphitheater

Chairs: J. Filiberto
C. D. K. Herd

- 8:30 a.m. Irving A. J. * Bunch T. E. Kuehner S. M. Korotev R. L. Classen N. C.
Unique Ultramafic Shergottite Northwest Africa 4797: A Highly Shocked Martian Wehrlite Cumulate Related to Enriched Basaltic (Not "Lherzolitic") Shergottites [#2047]
This unusual peridotite appears to be a cumulate from a basaltic shergottite magma, and is probably the most highly shocked martian rock yet discovered.
- 8:45 a.m. Dalton H. A. * Peslier A. H. Brandon A. D. Lee C.-T. A. Lapen T. J.
Petrology and Mineral Chemistry of New Olivine-Phyric Shergottite RBT 04262 [#2308]
New olivine-phyric shergottite RBT 04262 was analyzed with an electron microprobe to determine petrology and mineral chemistry.
- 9:00 a.m. Mikouchi T. * Kurihara T. Miyamoto M.
Petrology and Mineralogy of RBT 04262: Implications for Stratigraphy of the Lherzolitic Shergottite Igneous Block [#2403]
RBT 04262 is a new martian meteorite showing close affinities to lherzolitic shergottites. Its petrology and mineralogy suggest stratigraphy of the igneous block of lherzolitic shergottites similar to the nakhlite case.
- 9:15 a.m. Lapen T. J. * Brandon A. D. Beard B. L. Peslier A. H. Lee C.-T. A. Dalton H. A.
Lu-Hf Age and Isotope Systematics of the Olivine-Phyric Shergottite RBT 04262 and Implications for the Sources of Enriched Shergottites [#2073]
Lu-Hf age and isotope data of the recently discovered shergottite RBT 04262 indicates a crystallization age of 225 ± 21 Ma and that this meteorite is derived from a source that has a similar Lu/Hf ratio to the source(s) of Shergotty and Zagami.
- 9:30 a.m. Borg L. E. * Gaffney A. M. DePaolo D. J.
Preliminary Age of Martian Meteorite Northwest Africa 4468 and Its Relationship to the Other Incompatible-Element-enriched Shergottites [#1851]
A two-point Sm-Nd tie line yields a crystallization age for martian meteorite NWA 4468 of 150 ± 29 Ma and an initial ϵ_{Nd} of -6.9 ± 0.3 , indicating NWA 4468 is isotopically similar to NWA 1068, LA, and Shergotty.
- 9:45 a.m. Brandon A. D. * Walker R. J. Puchtel I. S. Irving A. J.
Re-Os Isotope Systematics of the Shergottite 'Depleted' End-Member [#1404]
The small resolved differences in the initial γ_{Os} of shergottites may result from modest variations in the materials accreting during late accretion, small amounts of Re/Os fractionation during magma ocean processes, or by later magmatic processes.
- 10:00 a.m. Walton E. L. * Jugo P. Herd C. D. K.
The Nature and Origin of Localized Shock Melts in Martian Meteorites: Major and Trace Element Composition, Sulfur Speciation and Texture of EET 79001 Shock Melt Veins and Pockets [#1880]
Major and trace element chemistry, as well as sulfur speciation, has been characterized in EET 79001 shock melts in order to constrain the materials which were melted to form them. Our results support *in situ* formation of shock melts.

- 10:15 a.m. Bogard D. D. * Park J.
Excess ^{40}Ar in Martian Shergottites, K - ^{40}Ar Ages of Nakhrites, and Implications for In Situ K - Ar Dating of Mars' Surface Rocks [#1100]
Martian shergottites contain similar concentrations of excess ^{40}Ar inherited from the magma; six martian nakhrites contain little excess ^{40}Ar and define an isochron age of 1325 m.y.; K - Ar dating on Mars will require rocks with varying K concentrations.
- 10:30 a.m. Shirai N. * Ebihara M.
Chemical Characteristics of Nakhrites: Implications to the Geological Setting for Nakhrites [#1643]
We performed bulk analysis for three nakhrites (Nakhla, Y-000593, and MIL 03346). Based on their chemical compositions, we discuss the geological environment for nakhrites.
- 10:45 a.m. Rutherford M. J. * Hammer J. E.
Oxidation States in MIL 03346 Nakhrite from Experiments Reproducing Phenocryst-Melt Equilibria as a Function of $f\text{O}_2$ and T at 40–150 Mpa [#1983]
Experiments on chips of MIL 03346 have reversibly duplicated crystal-melt equilibria for melts formed from both the groundmass and melt inclusions. The phenocryst core compositions are reproduced at 1125°C at QFM-2, but not at QFM-1, or QFM.
- 11:00 a.m. Herd C. D. K. * Walton E. L.
Cooling and Crystallization of the Miller Range 03346 Nakhrite: Insights from Experimental Petrology and Mineral Equilibria [#1496]
On the basis of experimental petrology of MIL 03346 mesostasis and oxybarometry of mesostasis minerals, we conclude that MIL 03346 crystallized at the surface of Mars under redox conditions of NNO-0.5 and at cooling rates between 3° and 6°C/hr.
- 11:15 a.m. Spivak-Birndorf L. J. * Wadhwa M. Williams L. B.
The Boron Isotopic Composition of Nakhla Iddingsite [#1904]
We report the first measurements of the $^{11}\text{B}/^{10}\text{B}$ ratio of iddingsite in Nakhla, using secondary ion mass spectrometry. The results can provide constraints on the B isotopic composition of the fluids from which these alteration products formed on Mars.
- 11:30 a.m. Ott U. *
An Almost Infinite Sink for Tightly Bound Xenon: Etched Shergotty and (Less So) Etched Nakhla [#1096]
Acid etching Nakhla and Shergotty resulted in residues containing large amounts of trapped terrestrial Kr and Xe . Gases trapped by Shergotty in particular were characterized by extreme elemental fractionation and tightly bound xenon.