

Thursday, March 15, 2007
MARTIAN METEORITES:
NAKHLITES, EXPERIMENTS, AND THE GREAT SHERGOTTITE AGE DEBATE
8:30 a.m. Crystal Ballroom B

Chairs: C. D. K. Herd
E. P. Vicenzi

- 8:30 a.m. Stopar J. D. * Taylor G. J. Norman M. D.
Major and Trace Elements in Nakhlite MIL 03346 with a Focus on Aqueous Alteration Products [#1448]
 REE abundances for clinopyroxene, olivine, mesostasis, olivine melt inclusions, and the alteration products of these phases in MIL 03346 were determined by LA-ICPMS. The REE patterns for these phases will be presented and compared to other nakhlites.
- 8:45 a.m. Vicenzi E. P. * Fries M. Fahey A. Rost D. Greenwood J. P. Steele A.
Detailed Elemental, Mineralogical, and Isotopic Examination of Jarosite in Martian Meteorite MIL 03346 [#2335]
 This study represents a detailed examination of the sulfate mineralization in MIL 03346 by means of SEM EDS, Raman, and hydrogen isotope analysis.
- 9:00 a.m. McKay G. * Schwandt C. Le L. Mikouchi T.
Minor Elements in Nakhlite Pyroxenes: Does Cr Record Changes in REDOX Conditions During Crystallization? [#1721]
 The origin of "reverse" Cr zoning in pyroxenes in nakhlite MIL 03346 is difficult to understand. One possibility is a change in REDOX conditions during crystallization. However, stoichiometry fails to support this proposition.
- 9:15 a.m. Farquhar J. * Kim S.-T. Masterson A.
Sulfur Isotope Analysis of the Nakhla Meteorite: Implications for the Origin of Sulfate and the Processing of Sulfur in the Meteorite Parent [#1438]
 Analyses of the sulfur isotopes for the Nakhla meteorite (BM 1913.25) point to a part of the sulfur cycle that is distinct from igneous, hydrothermal, and aqueous phase effects, and not accounted for by existing gas-phase photochemical experiments.
- 9:30 a.m. Shearer C. K. * Burger P. V. Papike J. J. Borg L. E. Irving A. J. Herd C. D. K.
Petrogenetic Linkages Among Martian Basalts. Implications Based on Trace Element Chemistry of Olivine [#1140]
 We define the petrogenesis of olivine in the olivine-phyric shergottites, evaluate its use in recording the earliest stages of martian basalt crystallization, and compare olivine in olivine-phyric shergottites to olivine in other martian basaltic lithologies (nakhlites, Iherzolitic shergottites).
- 9:45 a.m. Karner J. M. * Papike J. J. Shearer C. K. McKay G. Le L. Burger P.
Valence State Partitioning of Cr and V Between Pyroxene-Melt: Estimates of Oxygen Fugacity for Martian Basalt QUE 94201 [#1153]
 Based on DCr and DV between pigeonite cores and bulk composition, we estimate QUE 94201 crystallized at an f_{O_2} between IW+0.2 and IW+0.9, with DCr/DV suggesting IW+0.6.
- 10:00 a.m. Draper D. S. *
Water-Undersaturated Near-Liquidus Phase Relations of Yamato 980459: Preliminary Results [#1447]
 The Yamato 980459 liquidus is ~200° cooler under water-undersaturated conditions compared to anhydrous experiments. A wet Y98 source could mean a thicker martian crust and cooler melt generation temperatures.

- 10:15 a.m. Dalton H. A. * Sharp T. G. Holloway J. R.
Investigation of the Effects of Water on a Martian Mantle Composition [#2102]
High-pressure experiments were performed on a primitive martian meteorite composition with 0.5 weight percent H₂O added to determine the effect of water on martian melt compositions.
- 10:30 a.m. Calvin C. L. * Rutherford M. J.
Implications of Crystallization Experiments on a Parental Melt of ALH 77005 [#1198]
Crystallization experiments were performed on a parental melt of ALH 77005. Conclusions on the depth of crystallization, hydration state, and the role of P₂O₅ and Cr₂O₃ are discussed.
- 10:45 a.m. Shih C.-Y. * Nyquist L. E. Reese Y.
Rb-Sr and Sm-Nd Isotopic Studies of Martian Depleted Shergottites SaU 094/005 [#1745]
Sm-Nd mineral isochron of depleted shergottites SaU 005/094 indicates that they were formed 445±18 Ma ago, contemporaneous to DaG 476 and Y980459. A three-stage model is proposed for the genesis of these shergottites.
- 11:00 a.m. Herd C. D. K. * Simonetti A. Peterson N. D.
In Situ U-Pb Geochronology of Martian Baddeleyite by Laser Ablation MC-ICP-MS [#1664]
We report on the first *in situ* U-Pb geochronology of baddeleyite in martian meteorites. Using an 8-µm laser ablation spot size, coupled to a multicollector ICP-MS, we obtain ²⁰⁶Pb/²³⁸U ages of 171 ± 129 for NWA 3171 and 70 ± 35 Ma for Zagami.
- 11:15 a.m. Bouvier A. * Blichert-Toft J. Vervoort J. D. Albarède F.
The Conundrum of the Age of Shergottites [#1683]
We re-examine the contamination issue and show that a Pb-Pb age of ~4 Ga is the most tenable interpretation of Pb-Pb isotope systematics in shergottites, further supported by recent laser ablation Ar-Ar data.
- 11:30 a.m. Bogard D. D. * Park J.
Ar-Ar Age of NWA-1460 and Evidence for Young Formation Ages of the Shergottites [#1096]
Identical Ar-Ar, Sm-Nd, and Rb-Sr ages for NWA 1460 and evidence against significant ⁴⁰Ar degassing of Zagami during shock-heating to ~70°C argue against old formation ages for shergottites, but are consistent with young ages.