

Friday, March 16, 2007
CHONDRITES: SECONDARY PROCESSES
8:30 a.m. Crystal Ballroom B

Chairs: A. J. Brearley
R. E. Grimm

- 8:30 a.m. Grimm R. E. *
Fluid Flow on Carbonaceous Chondrite Parent Bodies [#1327]
Isotopic data require that fluid flow occurred on carbonaceous chondrite parent bodies. Reaction heat can be dissipated by hydrothermal convection.
- 8:45 a.m. Rubin A. E. *
Progressive Alteration of CM Chondrites: Effects on Refractory Inclusions [#1230]
QUE 97990, the least-altered CM chondrite, contains 1.8 vol.% CAIs and a number density of ~80 CAIs/cm². More-altered CM chondrites contain lower modal abundances and number densities of CAIs. Progressive whole-rock alteration forms melilite-free spinel inclusions from melilite-bearing inclusions.
- 9:00 a.m. Brearley A. J. * Burger P. V.
Hydrothermal Alteration Behavior of Kainsaz (CO₃) at Low Temperatures Under Reducing Conditions: Insights into Incipient Aqueous Alteration of Carbonaceous Chondrites [#1687]
We have altered samples of the CO₃ chondrite Kainsaz under reducing conditions at 100° and 200°C for time periods of 7 to 180 days. All samples show evidence of reaction including the precipitation of calcite and phyllosilicates on sample surfaces.
- 9:15 a.m. Ford R. * Brearley A. J.
Phyllosilicates in Two Coarse-Grained Allende CAIs: Evidence for Advanced Hydration [#2411]
We present the findings from two CAIs within the CV3 chondrite Allende. These CAIs have experienced extensive aqueous alteration and may represent parent body alteration.
- 9:30 a.m. Zolotov M. Yu. * Mironenko M. V.
Hydrogen Chloride as a Source of Acid Fluids in Parent Bodies of Chondrites [#2340]
We argue that early low-pH fluids in asteroids have been presented by HCl-rich aqueous solutions formed through eutectic (~186 K) melting of HCl hydrate(s).
- 9:45 a.m. Palmer E. E. * Laurretta D. S. Domanik K. J.
Variation in Aqueous Alteration in the Murray CM Chondrite [#1416]
We studied metal grains in the Murray CM chondrite to determine its alteration history. Some assemblages showed no alteration including small metal grains in the matrix. Other assemblages had major alteration though less than a centimeter apart.
- 10:00 a.m. Perronnet M. * Berger G. Zolensky M. E. Toplis M. J. Kolb V. M. Bajagic M.
The Aqueous Alteration of CR Chondrites: Experiments and Geochemical Modeling [#1110]
Laboratory alteration experiments were performed on mineralogical assemblages having the unaltered CR composition. The mineralogy of reaction products was compared to that of Renazzo and GRO 95577 and to predictions of geochemical modeling.
- 10:15 a.m. Sharp T. G. * Xie Z. Soignard E. DeCarli P.
An Experimental Simulation of Shock-Vein Crystallization Using the Multi-Anvil Apparatus [#1364]
We are conducting L-chondrite melting experiments in the multi-anvil apparatus to investigate the mineralogy and mineral textures produced by rapid quench from superliquidus conditions at pressure from 17 to 22 GPa. Our experimental products are very similar to natural shock veins.

- 10:30 a.m. Sokol A. K. * Bischoff A. Marhas K. K. Mezger K. Zinner E.
Early Solar System Chronology: Simultaneous Accretion of Differentiated and Metamorphosed Asteroidal Clasts and Chondrules? [#1296]
Some very primitive chondrites contain unusual fragments that seem to be either of metamorphic or igneous origin. These objects may represent clasts of precursor planetesimals. Al-Mg isotope data for several of these fragments are presented.
- 10:45 a.m. Abreu N. M. * Brearley A. J.
Unique Graphite and Amphibole-rich Clast in QUE 99177: An Extensively Metamorphosed Xenolith in a Pristine CR3 Chondrite [#2419]
CR chondrites are primitive carbonaceous chondrites, recording variable degrees of aqueous alteration and negligible thermal metamorphism. QUE 99177 contains a unique clast that shows signs of high-temperature processing. Here, we present SEM and quantitative EMPA observations.
- 11:00 a.m. Treiman A. H. * Alexander C. M. O'D. Essene E. J. McCanta M. C.
The Amphibole-Phlogopite R-Chondrite LAP 04840: Hot Hydration by Heavy H₂O [#1309]
Amphibole and biotite in LAP 04840 have very heavy H ($\delta D \sim -3660\text{‰}$). Mineral compositions imply equilibria at 655°C, 100–700 bars H₂O. Textures suggest that LAP formed as water entered a hot dry rock — the source of the water was likely macromolecular carbons in chondritic precursors.
- 11:15 a.m. Le Guillou C. * Rouzaud J. N.
Nanodiamonds Graphitization Under Temperature: Implications on Their Evolution During Chondrites Parent Body Metamorphism [#1578]
We study the nanodiamond graphitization under temperature (Raman spectroscopy, HRTEM) to understand why the nanodiamond amount in chondrites decreases with increasing metamorphic grade. We also try to constrain the reaction kinetic parameters.
- 11:30 a.m. Yabuta H. * Cody G. D. Alexander C. M. O'D.
Chondritic Organic Matter as an Indicator of Nebular and Parent Body Processing: Extended Pyrolysis Studies for CM, CI, CR, CO, CV, Ordinary, and Tagish Lake Group Meteorites [#2304]
The pyrolysis gas chromatography-mass spectrometry technique has been extended to 23 kinds of insoluble organic matter from CI, CM2, CR2, CO, CV, OC, and Tagish Lake chondrites. A variety of pyrolysis product molecules are discussed as indicators of the parent body processing.