

Wednesday, March 21, 2012
CHONDRULE FORMATION AND DISK CHEMISTRY
 8:30 a.m. Montgomery Ballroom

Chairs: Harold Connolly Jr.
 Brigitte Zanda

- 8:30 a.m. Hood L. L. * Weidenschilling S. J.
[*The Planetesimal Bow Shock Model for Chondrule Formation: Sizes of Highly Eccentric Planetesimals and Initial Simulations for a Radially Migrating Jupiter*](#) [#2110]
 Improved simulations of planetesimal orbital evolution in the presence of jovian resonances are reported to better evaluate the conditions under which chondrules may have formed in bow shocks of highly eccentric planetesimals.
- 8:45 a.m. Zanda B. * Humayun M. Hewins R. H.
[*Chemical Composition of Matrix and Chondrules in Carbonaceous Chondrites: Implications for Disk Transport*](#) [#2413]
 LA-ICP-MS analyses of unaltered matrix, chondrules, and bulk CM and CR chondrites show that the preaccretionary matrix had a CI composition. Chondrules could have formed in the inner disk and been transported to be embedded in matrix further out.
- 9:00 a.m. Morris M. A. * Desch S. J. Boley A. C.
[*The Chemical Environment Experienced by Chondrules Formed in Planetary Embryo Bow Shocks*](#) [#2782]
 We investigate the chemical environment of chondrules formed in planetary embryo bow shocks. We find that many aspects of chondrule formation are explained by interaction of chondrules with volatiles outgassed from the protoplanet's magma ocean.
- 9:15 a.m. Fedkin A. V. Grossman L. * Ciesla F. J.
[*Extreme Conditions Required for Suppression of Alkali Evaporation During Chondrule Formation*](#) [#2565]
 Na retention during formation of FeO-bearing chondrules requires very high nebular pressures, and very large enrichments of dust and water. This is suggestive of formation in vapor + liquid + solid plumes generated by impacts on icy planetesimals.
- 9:30 a.m. Armytage R. M. G. * Georg R. B. Williams H. M. Halliday A. N.
[*Silicon Isotopic Composition of Allende Chondrules and Nebular Processes*](#) [#1971]
 We present new high-precision silicon isotope data for chondrules from Allende. The variations observed are consistent with either sampling precursor heterogeneities in the nebula or evaporation and recondensation chondrule formation processes.
- 9:45 a.m. Mendybaev R. A. * Richter F. M. Marin-Carbonne J. McKeegan K. D.
[*Crystallization of Evaporating Forsterite-Rich Melts: Texture and Magnesium and Silicon Isotopic Compositions of the Evaporation Residues*](#) [#2482]
 We present first results on texture and isotopic compositions of residues produced by cooling Fe-rich materials in vacuum. The results show that it is evaporation that controls the textures and Mg- and Si-isotopic compositions of crystallized phases.
- 10:00 a.m. Schrader D. L. * Connolly H. C. Jr. Lauretta D. S. Nagashima K. Huss G. R. Davidson J. Domanik K.
[*O-Isotope Composition of the Gas Present During Chondrule Formation as Recorded in CR Chondrites*](#) [#1627]
 We present observations that constrain the O-isotope composition of the gas reservoir that exchanged with ferromagnesian chondrules from CR chondrites.

- 10:15 a.m. Nagashima K. * Krot A. N. Huss G. R.
[Oxygen-Isotope Compositions of Chondrules and Matrix Grains in the LEW 87232, Kakangari-Like Chondrite](#) [#1768]
 In LEW 87232 K-chondrite, most chondrule grains have $\Delta^{17}\text{O} \sim 0\text{‰}$ while matrix is isotopically heterogeneous, with the ^{16}O -poor grains having $\Delta^{17}\text{O} \sim -2\text{‰}$. The chondrules and ^{16}O -poor matrix grains appear to have sampled different O-isotope reservoirs.
- 10:30 a.m. Tenner T. J. * Nakashima D. Ushikubo T. Kita N. T. Weisberg M. K.
[Oxygen Isotopes of Chondrules in the Queen Alexandra Range 99177 CR3 Chondrite: Further Evidence for Systematic Relationships Between Chondrule Mg# and \$\Delta^{17}\text{O}\$ and the Role of Ice During Chondrule Formation](#) [#2127]
 QUE 99177 chondrules steadily rise in $\Delta^{17}\text{O}$ (-5 to -1 ‰) as Mg# decreases (99 to 97). Addition of $+\Delta^{17}\text{O}$ H_2O ice to dry precursors could reduce chondrule Mg# (by oxidation during formation) while increasing $\Delta^{17}\text{O}$. Estimated H_2O ice $\Delta^{17}\text{O}$ is 0.5 to 6‰.
- 10:45 a.m. Soulié C. * Libourel G. Tissandier L. Hiver J.-M.
[Kinetics of Olivine Dissolution in Chondrule Melts: An Experimental Study](#) [#1840]
 We present three-dimensional X-ray microtomography images of partially resorbed forsterites in different silicate melts at high temperature that allow us to calculate the dissolution rates of olivines in chondrule melts.
- 11:00 a.m. Barcena H. * Connolly H. C. Jr.
[Constraining the Nature of Type-I Chondrules: I. Chemical Models](#) [#2506]
 We explore the chemical reactions that took place during the melt synthesis of ferromagnesian chondrules, the expected molecular species released to the ambient environment, and the heterogeneous reactions that occurred with the surrounding gas.
- 11:15 a.m. Connolly H. C. Jr. * Barcena H. Domanik K. Nagashima K. Nagashima K. Huss G. R. Ash R. D. Weisberg M. K.
[Constraining the Nature of Type-I Chondrules from UOC's: A Detailed In Situ Petrologic and Geochemical Investigation](#) [#2204]
 We investigated type-I chondrules from two L3.05 UOCs and determined the petrography; major, minor, and oxygen isotopic abundances of their silicates and spinels; plus siderophile-element abundances of the FeNi metal to constrain their formation.
- 11:30 a.m. Tachibana S. *
[Nucleation and Growth of Iron Sulfide on Metallic Iron Particles Under Low-Pressure Protoplanetary Disk Conditions](#) [#1814]
 Nucleation and growth kinetics of iron sulfide on 1- μm -sized metallic iron grains were experimentally investigated in the He- H_2S gas at 1 Pa. Nucleation seems to occur as fast as the further growth process at the present experimental condition.