CHONDRULES AND CHONDRITES
8:30 a.m. Marina Plaza Ballroom

Chairs: H. C. Connolly Jr.
A. E. Rubin

8:30 a.m. Alexander C. M. O’D.*  
*Re-Examining the Role of Chondrules in Producing the Elemental Fractionations in Chondrites [#1348]
A CI-like component dominates chondrite matrices and carries the most volatile elements. Chondrules are responsible for the elemental fractionations in OCs. Loss of type IA chondrules, and gain of type IA evaporates can explain the compositions of bulk OCs, and type IIA and type B chondrules.

8:45 a.m. Scott E. R. D. *  Krot A. N.  
Thermal Processing and Accretion of Silicate Dust into Chondrites and Comets [#2007]
Matrices of primitive chondrites resemble crystalline and amorphous silicates in IDPs and probably condensed in chondrule-forming regions. This favors shock formation at 2–3 AU and rim accretion after matrix silicates were mixed with sticky organics.

9:00 a.m. Connolly H. C. Jr.*  Jones R. H.  
Understanding the Cooling Rates Experienced by Type II Porphyritic Chondrules [#1881]
We review how the cooling rates of chondrules are determined, what the rates are for type IIA chondrules, and discuss the implications and limitation of the different rates that have been determined.

9:15 a.m. Libourel G. *  Krot A. N.    Tissandier L.  
Gas-Melt Interaction During Chondrule Formation [#1877]
The mineralogy, chemistry and isotopic compositions of chondrules in primitive chondrites are inconsistent with their closed-system crystallization and suggest instead that gas-melt interaction played a major role in evolution of chondrule melts.

9:30 a.m. Cohen B. A.    Levasseur S.    Zanda B.    Hewins R. H. *  Halliday A. N.  
Isotopic Mass Fractionation of Iron in Chondrules, Evaporation or Reduction? [#1690]
The nature of Fe-isotopic mass fractionation measured in chondrules is controversial. Reduction experiments of fayalite yielded a strongly fractionated glass along side metal lacking mass fractionation. We argue for a diffusion-controlled fractionation to explain the data.

9:45 a.m. Fedkin A. V. *  Grossman L.    Ghiorso M. S.  
Vapor Pressures and Evaporation Coefficients of Fe, Na and K over Chondrule Composition Melts [#2273]
We applied MELTS to published evaporation data on chondrule liquids to get vapor pressures and evaporation coefficients for Na, K and Fe. This approach explains the persistence for many hours of Fe metal and significant FeO in the Cohen and Hewins (2004) experiments.

10:00 a.m. Tachibana S. *  Huss G. R.    Kita N. T.    Shimoda H.    Morishita Y.  
The Abundances of Iron-60 in Pyroxene Chondrules from Unequilibrated Ordinary Chondrites [#1529]
Excesses of $^{60}$Ni, which correlate with Fe/Ni ratios, have been found in four pyroxene-rich chondrules from unequilibrated ordinary chondrites, Semarkona and Bishunpur. The inferred ($^{60}$Fe/$^{56}$Fe)$_0$ for the chondrules range from $2 \times 10^{-7}$ to $5 \times 10^{-7}$.
10:15 a.m. Nakamoto T. * Hayashi M. R. Kita N. T. Tachibana S.
*Generation of Chondrule Forming Shock Waves in Solar Nebula by X-Ray Flares* [#1256]
Our Magneto-Hydrodynamics numerical simulations show that chondrule forming shock waves, which are appropriate for chondrule formation, are generated in the upper region of the solar nebula by X-ray flares and expanding magnetic bubbles.

10:30 a.m. Miura H. * Nakamoto T.
*Appropriate Shock Waves for Chondrule Formation: Heating Rate and Cooling Rate Constraints* [#1248]
In order to produce chondrules, the heating mechanism should satisfy at least two constraints: the rapid heating and the appropriate cooling rate. Shock waves generated by the X-ray flares seem to satisfy both constraints.

10:45 a.m. Zolotov M. Yu. Mironenko M. V. Shock E. L.
*Aqueous Alteration and Hydrogen Generation on Parent Bodies of Unequilibrated Ordinary Chondrites: Thermodynamic Modeling for the Semarkona Composition* [#2271]
Aqueous alteration is modeled in conjunction with changes in volumes and pressure along with reaction progress. The results are consistent with redox and hydration/dehydration pathways in chondrites.

11:00 a.m. Brandon A. D. * Puchtel I. S. Humayun M. Zolensky M.
*Osmium Isotope Evidence for an S-Process Carrier in Primitive Chondrites* [#1396]
Depletions in $^{186}$Os, $^{188}$Os and $^{190}$Os in Tagish Lake, Ornans, Parnelle, and Indarch relative to H-Group ordinary chondrites is likely the result of an undigested s-process carrier for Os. Alternatively, these systematics may result from nebular heterogeneity.

11:15 a.m. Rubin A. E. *
*Relationships Among Oxidation State, Bulk Chemistry, Oxygen-Isotopic Composition, Petrologic Type and Chondrule Size in Ordinary Chondrites* [#1226]
Each ordinary-chondrite group comprises chondrites of different petrologic types and exhibits a narrow range in oxidation state, bulk chemical composition, O-isotopic composition and chondrule size. Relationships among these properties reflect both nebular and asteroidal processes.