

Tuesday, July 28, 2015  
**CAIS AND OTHER REFRACTORY MATERIALS**  
 8:30 a.m. Stanley Hall Room 105

**Chairs:** Audrey Bouvier  
 Timothy Fagan

- 8:30 a.m. Kööp L. \* Davis A. M. Kita N. T. Nakashima D. Tenner T. J. Krot A. N. Park C. Nagashima K. Heck P. R.  
[\*<sup>26</sup>Al-Depletions in Anomalous and Solar PLAC-Like CAIs Suggest High Degrees of Processing in the Early Solar Nebula\*](#) [#5225]  
 Our Al-Mg study of PLAC-like CAIs shows that both isotopically anomalous and solar (in terms of O, Ca, Ti) PLAC-like CAIs are depleted in <sup>26</sup>Al, suggesting that homogenized reservoir(s) had been established prior to a widespread distribution of <sup>26</sup>Al.
- 8:45 a.m. Kawasaki N. \* Sakamoto N. Yurimoto H.  
[\*Formation Period for a Fluffy Type A CAI from Vigarano\*](#) [#5028]  
 We measured the O and Al-Mg isotopes of a fluffy Type A CAI from Vigarano. The results suggest the CAI was formed within a time duration of 0.22 ± 0.11 Myr in a variable O isotope reservoir changing from <sup>16</sup>O-rich to <sup>16</sup>O-poor and back to <sup>16</sup>O-rich.
- 9:00 a.m. Paque J. M. \* Burnett D. S. Beckett J. R. Guan Y.  
[\*Materials Older Than Ca-Al-Rich Inclusions\*](#) [#5281]  
 Concentrations of refractory lithophile elements (RLE) in CAIs are dominated by potentially relict submicron inclusions. Thousands of SIMS analyses in Leoville and Allende allow resolution of RLE concentrations of melilite and inclusions.
- 9:15 a.m. Bouvier A. \* Boyet M.  
[\*Sm and Nd Isotopic Compositions of CAIs\*](#) [#5294]  
 We have measured the Sm and Nd stable and radiogenic isotopic compositions of two individual CAIs. We report isotopic anomalies and an initial solar system <sup>146</sup>Sm/<sup>144</sup>Sm value which is more consistent with using a <sup>146</sup>Sm half-life of 68 Ma.
- 9:30 a.m. Tang H. \* Liu M-C. McKeegan K. D. Tissot F. L. H. Dauphas N.  
[\*Oxygen Isotopes and High <sup>26</sup>Mg Excesses in a U-Depleted Fine-Grained Allende CAI\*](#) [#5263]  
 We analyzed the oxygen isotope compositions and Al-Mg systematics of a U-depleted fine-grained Allende CAI ME-3364 3.2 to constrain the conditions of its formation and a high, uniform <sup>26</sup>Mg excess was identified over a large range of <sup>27</sup>Al/<sup>24</sup>Mg values.
- 9:45 a.m. Mishra R. K. \* Simon J. I. Messenger S. Marhas K. K. Ross D. K. Needham A. W. Han J.  
[\*Oxygen Isotopes in Perovskites and Associated Mineral Assemblages in a Hibonite-Bearing Allende CAI\*](#) [#5133]  
 Heterogeneous oxygen isotopes are measured by NanoSIMS in perovskite contained in the Wark-Lovering rim and multiple distinct assemblages of refractory minerals contain within a hibonite-bearing Allende CAI.
- 10:00 a.m. Lee T. \* Liebig B. Peeters Z. Wang C.-K.  
[\*An Interesting Place to Search for Pre-Solar Ca and Ti\*](#) [#5295]  
 Perovskite in CAI rim may be a good place to search for presolar Ca and Ti. We have found an Allende CAI with a rim rich in perovskite <7µm. A SIMS technique is being developed to study Ca and Ti isotopes on um-sized grains with <1% precision.

- 10:15 a.m. Fagan T. J. \* Aragane H. Enokido Y. Brearley A. J.  
[Metamorphism of an Efremovka Type B CAI and Comparison with Other Settings of Alteration](#) [#5094]  
Primary minerals in a type B CAI from Efremovka are partially altered to feldspathoids, Fe-spinel and secondary anorthite. The extent of recrystallization is not as great as in typical Allende CAIs, but metamorphism has affected Efremovka CAIs.
- 10:30 a.m. Daly L. \* Bland P. A. Forman L. V. Trimby P. W. Moody S. Yang L. Liu H. W. Ringer S. P. Saunders M.  
[In Situ Analysis of Refractory Metal Nugget Crystallography Providing Clues to Early Solar System Events](#) [#5061]  
In situ analysis of refractory metal nuggets has revealed several textural features that have not previously been reported, such as twinning and crystallographic relationships with associated minerals; as well as the discovery of a new mineral phase.
- 10:45 a.m. Needham A. W. \* Messenger S. Keller L. P. Simon J. I. Han J. Mishra R. K. Marhas K. K.  
[Aluminum-Magnesium Isotope Systematics in Wark-Lovering Rims](#) [#5014]  
Here we present Al-Mg isotope data for the core, mantle and Wark-Lovering rim of a CAI. Evidence for live  $^{26}\text{Al}$  is found in the mantle melilite, rim melilite and rim hibonite but is lacking in rim anorthite.
- 11:00 a.m. Mane P. \* Hervig R. Bose M. Wadhwa M.  
[Trace Element Abundances in Wark-Lovering Rims of CAIs from a CV3 Meteorite: Implications for Their Chronology](#) [#5327]  
We report trace element analyses of Wark-Lovering rims and their host CAIs from NWA 8323 CV3 chondrite to assess the potential effects of secondary alteration and conclude that they are minimally affected by such processes.
- 11:15 a.m. Han J. \* Keller L. P. Needham A. W. Messenger S. Simon J. I.  
[Microstructural Investigation of a Wark-Lovering Rim on a Vigarano CAI](#) [#5243]  
We describe the microstructure and mineralogy of a Wark-Lovering rim on a Vigarano type B CAI using FIB/TEM to better understand the astrophysical significance of Wark-Lovering rim formation.
- 11:30 a.m. Beckett J. R. \* Harvey J. P. Ma C. Stolper E. M.  
[The Stability of Zirconia-Saturated Perovskite and Conditions in the Early Solar System](#) [#5245]  
We conducted experiments on zirconia-saturated perovskites in the system CaO-TiO<sub>2</sub>-ZrO<sub>2</sub> and on the same bulk compositions doped with one of Al, Mg, Sc, Y, La, Nd, Gd, or Yb.
- 11:45 a.m. Ma C. \* Krot A. N. Beckett J. R. Nagashima K. Tschauer O.  
[Discovery of Warkite,  \$\text{Ca}\_7\text{Sc}\_6\text{Al}\_6\text{O}\_{70}\$ , a New Sc-Rich Ultra-Refractory Mineral in Murchison and Vigarano](#) [#5025]  
Warkite is a new Sc-rich mineral, discovered in ultra-refractory inclusions. It is likely a very-early player in the final assembling of solid materials from an  $^{16}\text{O}$ -rich gaseous reservoir, formed under highly reducing conditions.