Tuesday, July 25, 2017
VOLATILES, CARBON AND ORGANICS — THE UNIVERSAL CYCLE
1:30 p.m. Sweeney A

This session examines the behavior of volatile elements, especially carbon in the early solar system and the formation of organic components in different astrophysical environments and asteroidal parent bodies.

Chairs: **Christian Vollmer**
Rachel Smith

1:30 p.m. Smith R. L. * Blake G. A. Boogert A. C. A. Pontoppidan K. M.
An Observational Survey of Protoplanetary Carbon in Young Stellar Systems Across the Galaxy **[#6174]**
Our high-resolution survey of CO obtained with the Keck telescope toward massive YSOs in the Galaxy suggests that CO_2 may not originate from CO, and carbon may follow similar chemical pathways in a range of protoplanetary environments.

1:45 p.m. Nuth J. A. * Johnson N. M. Ferguson F. T.
A Large Scale Carbon Cycle must Operate Throughout the Solar Nebula **[#6348]**
Most presolar carbonaceous solids should be destroyed by transient heating processes in the solar nebula, converting them to CO. We will discuss the processes that transform CO back into solids that can be more easily accreted into planetesimals.

2:00 p.m. Lyons J. R. * Gharib-Nezhad E. Ayres T. R.
The Carbon Isotope Composition of the Sun: Implications for Solar System Formation **[#6370]**
Following a new analysis of CO spectral lines in the solar photosphere, we have obtained a C isotope ratio of $\delta^{13}C = -48 \pm 7‰$ VPDB. Enrichment of terrestrial planets in ^{13}C may have occurred due to CO self-shielding in the parent cloud.

2:15 p.m. Chakraborty S. * Thiemens M. H.
Photochemistry of Volatiles in the Solar Nebula **[#6337]**
This abstract describes an isotope based photochemical evolution of the volatiles in the solar nebula anchored on laboratory experimental results.

2:30 p.m. Will P. * Maden C. Busemann H.
Primordial Noble Gases in "Phase Q" from the CV3 Chondrite Vigarano Studied by Closed-System Step Etching (CSSE) **[#6353]**
We present the first closed-system step etching experiment on the acid-resistant residue of a reduced CV3 chondrite, Vigarano. Its phase Q noble gas composition reflects a higher degree of hydrous alteration than experienced by the CV3ox chondrites.

2:45 p.m. Tamijani A. A. * Asaduzzaman A. Zega T. J. Runge K. Muralidharan K.
Adsorption and Assembly of Simple Organics, Amino Acids, and Sugar Molecules on Mineral Grains in the Accretion Disk **[#6310]**
Using DFT, it can be deduced that endogenous delivery of simple to complex organics such as amino acids should be probable. Surface-mediated synthesis of organics represent possible pathways in the parent body and in the protoplanetary disks.

3:00 p.m. Bassez M. P. *
A Hypothesis to Explain the Presence of Amino Acids in the Tagish Lake Meteorite **[#6035]**
The Tagish Lake meteorite contains organic matter abiotically synthesized. An explanation is proposed on the basis of thermodynamic calculations and the presence of minerals.

3:15 p.m. Vollmer C. * Leitner J. Busemann H. Spring N. H. Kepaptsoglou D. Ramasse Q. M. Hoppe P.
Nitrogen Functional Chemistry of Organic Grains in CR Chondrites and IDPs **[#6206]**
We report on NanoSIMS-UltraSTEM(60 kV)-EELS investigations on organic grains from several CR chondrites and interplanetary dust particles with a focus on nitrogen functional chemistry. Fluid reactions might have modified organic matter functionality.

3:30 p.m. Leitner J. * Vollmer C. Hoppe P.
A SEM and NanoSIMS Investigation of Organic Aggregates in the CR Chondrites Miller Range 07525 and Renazzo **[#6154]**
Three organic aggregates from Renazzo with layered (multi-)globular morphologies and heterogeneous ^{15}N-enrichments give strong support for modification and N-isotope redistribution by possibly episodic fluid interactions on the parent body.

3:45 p.m. Bose M. * Zega T. J. Haenecour P. Domanik K.
Correlated Deuterium and Nitrogen Isotopic Enrichments in Meteoritic Organic Matter **[#6033]**
Two hotspots with correlated N and H isotopic anomalies, as well as two C-rich domains with N and C anomalies have been identified, after investigating a suite of CM, CV and ungrouped carbonaceous chondrites.

4:00 p.m. Changela H. G. * Zhao X. Miao B. Xia Z. Lin Y.
Comparative Microanalytical Study of Solid Organic Material in the CR2 Grove Mountain 021710 and the Ungrouped Carbonaceous Chondrite Ningqiang **[#6212]**
Organic material has been characterized *in situ* using traditional polished thin sections of GRV 021710 (CR2) and Ningqiang. Elevated thermal histories probably on the Ningqiang parent body have distributed OM in relict phases as well as matrix.

4:15 p.m. Haenecour P. * Zega T. J. Bose M. Howe J. Y.
Electron Energy-Loss Spectroscopy of Deuterium-Rich Organic Matter in the CM Chondrite Queen Alexandra Range 97990 **[#6138]**
We report electron energy-loss spectroscopy measurements of a D-rich hotspot identified in the CM2.6 chondrite QUE 97990. The hotspot consists of an accumulation of nanoglobule-like objects mostly composed of aromatic C inside a micropore structure.

4:30 p.m. Le Guillou C. * Bernard S.
Functional Groups Quantification of Chondritic Organics by XANES Spectroscopy **[#6344]**
We have developed a new method to quantify the functional group concentration of organics using STXM-XANES. Applied to IOM and *in situ* FIB sections measurement, it reveals a lower aromaticity than expected from previous NMR results (35% vs. 60%).

4:45 p.m. Kebukawa Y. * Kobayashi H. Baden N. Urayama N. Kobayashi K.
Nanoscale Imaging Analysis of Organic-Mineral Association in the Murchison Meteorite by NanoIR **[#6093]**
We demonstrate infrared imaging analysis of a carbonaceous chondrite with less than 100 nm spatial resolution that is far below conventional optical diffraction limits.

5:00 p.m. Visser R. * John T. Menneken M. Patzek M. Bischoff A.
Raman Temperature Constrains of Volatile-Rich Clasts in Polymict Ureilites, Polymict Eucrites, and Howardites **[#6097]**
Raman thermometry is used to constrain peak temperatures of amorphous carbon of so far not properly characterized and classified volatile-rich clasts inside brecciated achondrites.

5:15 p.m. Haas B. A. * Floss C. Kearsley A. T. Burchell M. J.
Characterizing Comet 81P/Wild 2 with Tagish Lake Analog Foils **[#6246]**
NASA's Stardust mission successfully returned samples from Comet 81P/Wild 2, but the material was heavily altered as a result of high collection velocities (6.1 km/s). We assess the alteration of organic samples in the Stardust foil collector.