

Thursday, March 15, 2007

ASTROBIOLOGY

8:30 a.m. Amphitheater

Chairs: S. D. Vance
J. G. Blank

- 8:30 a.m. Glamoclija M. * Schieber J. Szykiewicz A. Beard B.
Sulfur and Iron Geochemistry, and Their Relations to Microbial Communities from the Submarine Hydrothermal Site North of Panarea Island, Tyrrhenian Sea, Italy [#2270]
We present combined $\delta^{34}\text{S}$ and $\delta^{56}\text{Fe}$ data obtained from geologically young hydrothermal crusts from a submarine vent north of Panarea Island, Tyrrhenian Sea, Italy, and correlated with differences in sample mineralogy, microbial morphologies, and $\delta^{13}\text{C}$.
- 8:45 a.m. Black J. R. * Yin Q.-Z. Casey W. H.
Photosynthesis and Biogenic Fractionation of Magnesium Isotopes: An Experimental Study [#1938]
Magnesium isotopic fractionations associated with chlorophyll-a may provide a new tool for identifying the abundance of molecular oxygen producing photosynthesis in specific environments here on our planet and others.
- 9:00 a.m. Chafetz H. S. *
Bacterially Induced Mn-Oxides: Mn^{+4} a Biosignature [#1365]
Bacterially induced deposits from Yellowstone, N.P., New Mexico, and Morocco display oxidation states ≥ 3.7 whereas laboratory produced abiotic Mn-oxides are reported around 3.0. A high Mn-oxidation state is a possible indicator of bacterially induced precipitation, i.e., a biosignature.
- 9:15 a.m. Kuhlman K. R. * McKay C. P.
Occurrence of Rock Varnish at Yungay, Atacama Desert, Chile [#2251]
Rock varnish is a thin nanostratigraphic coating consisting of clay particles cemented together by Fe and Mn oxides and is ubiquitous in arid climates. We report the occurrence of rock varnish in the Mars-like conditions present at Yungay.
- 9:30 a.m. Van Houten K. A. * Pilato R. S. Murray G. M. Izenberg N. R.
Affinity Resins for Biomarker Amine Detection [#2034]
Molecular Imprinted Polymer (MIP)-based sensors are being developed to detect biomarkers and biosigns for astrobiological planetary and space environment applications.
- 9:45 a.m. Binet L. Gourier D. * Skrzypczak-Bonduelle A. Delpoux O. Derenne S.
EPR and Primitive Life: Dating and Visualizing the Organic Matter in the Oldest Rocks [#1533]
An EPR study of cherts of different ages showed that the age of the embedded fossil organic matter can be estimated from the EPR lineshape of the radicals. Nondestructive 3D visualization of bacterial mats in cherts is also possible by EPR imaging.
- 10:00 a.m. Huang Y. * Alexandre M. R.
Racemic Monocarboxylic Acids in Carbonaceous Chondrites Question UVCPL as the Source of Molecular Asymmetry Observed in Meteoritic Amino Acids [#1798]
We discover, for the first time, that monocarboxylic acids in Murchison and Orgueil are racemic. The contrast between monoacids and amino acids are inconsistent with the popular theory for the origin of chirality by UVCPL.
- 10:15 a.m. Lindgren P. Parnell J. * Bowden S. A. Taylor C. Osinski G. R. Lee P.
Preservation of Organic Carbon in Impact Melt Breccia, Haughton Impact Structure [#1142]
Quantitative analysis of organic carbon contents in target rocks and melt breccias in a crater shows that at least 20% of the carbon is preserved through the melt process, so fossil carbon should survive on heavily impacted planetary surfaces.

- 10:30 a.m. Misgaiski M. * Meyer C. Stöffler D. Fritz J. Horneck G. Moeller R. Rabbow E. Cockell C. S. De Vera J. P. Ott S. Hornemann U.
The Influence of Shock Pressure, Pre-Shock Temperature, and Host Rock Composition on the Survival Rate of Endolithic Microorganisms During Impact Ejection from Mars [#1286]
Petrographic and biological analysis of shock recovery experiments confirms the possible life transport due to an impact from Mars to Earth.
- 10:45 a.m. Blank C. E. * Ahrens T. J. Long M. Bertani L. E. Rashev M. Cady S. L. Hugo R. C. Orphan V. J.
Ballistic Impact Studies of a Thermophilic Bacterium — The Importance of Growth Phase in Survival [#2206]
Our studies of *Thermus* and *E. coli* suggest that growth temperature, growth phase (whether cells are actively growing or starved), morphology, and cell wall ultrastructure play important roles in microbial survivability following ballistic impact.
- 11:00 a.m. Altheide T. * Chevrier V. Kral T.
Oxidation of Iron and Metabolization of Carbonate Through Methanogenesis: Implications for the Early Terrestrial Environment [#1063]
The appearance of life on early Earth had tremendous effects on the surrounding environment, most notably, by allowing the build up of oxygen. In addition to photosynthetic life, methane producing microbes may have also contributed by a more indirect method.
- 11:15 a.m. Cates N. L. * Mojzsis S. J.
“Rare” or “Prevalent” Earth? Conditions Suitable for Life were Established Rapidly on the Young Earth [#2239]
There is mounting evidence that Earth became habitable very early in its history, boding well for the search of other habitable planets in our galactic neighborhood.
- 11:30 a.m. Moores J. E. * Smith P. H. Tanner R. Schuerger A. C. Venkateswaran K. J.
The Shielding Effect of Small-Scale Surface Geometry on Ultraviolet Flux [#1285]
A radiative transfer sky model was used to derive the reduction in UV flux on the surface of Mars due to rocks, pits, cracks, and overhangs. The implications for planetary protection and the survival of simple organic molecules in terms of the extension of residence times will be discussed.