

Friday, March 21, 2003
ASTROBIOLOGY: THE NEW DETECTIVES
8:30 a.m. Salon A

Chairs: C. C. Allen
J. F. Lindsay

De Gregorio B. T. * Sharp T. G.

Determining the Biogenicity of Microfossils in the Apex Chert, Western Australia, Using Transmission Electron Microscopy [#1267]

Research using high resolution imaging, EDS, and EELS shows that the carbon in the Apex Chert is amorphous kerogen, not graphite. However, evidence of hydrothermal activity is also found, which complicates the issue of biogenicity.

Lindsay J. F. * Brasier M. D. McLoughlin N. Green O. R. Fogel M. McNamara K. M. Steele A. Mertzman S. A.

Abiotic Earth — Establishing a Baseline for Earliest Life, Data from the Archean of Western Australia [#1137]

In a re-evaluation of stromatolitic structure from the Warrawoona Group we conclude that they are abiotic and were deposited by precipitation from hydrothermal solutions. Oxygenic photosynthesis may not have become important on Earth until Late Archean.

Skrzypczak A. Binet L. * Gourier D. Derenne S. Robert F.

On the Controversial Biogenicity of the Organic Matter in the Oldest Archean Cherts: Can Electron Paramagnetic Resonance Provide Clues? [#1677]

Organic radicals in the Warrawoona chert were analyzed by EPR, and compared to those in biogenic organic matter (OM) in two younger cherts. Similar behaviors of the radicals upon heating indicate similar ageing mechanisms for the OMs in these cherts.

Golden D. C. Ming D. W. * Morris R. V. Brearley A. J. Lauer H. V. Jr. Treiman A. Zolensky M. E. Schwandt C. S. Lofgren G. E. McKay G. A.

Morphological Evidence for an Exclusively Inorganic Origin for Magnetite in Martian Meteorite ALH84001 [#1970]

We show that the morphology of purported biogenic magnetite associated with carbonate globules in Martian meteorite ALH84001 can be reproduced exclusively by inorganic processes.

Buseck P. R. * Weyland M. Midgley P. A. Dunin-Borkowski R. E. Frankel R. B.

Are Current TEM Techniques Adequate to Resolve the ALH84001 life-on-Mars Controversy? [#2044]

Improved TEM measurements are required to permit reliable conclusions to be drawn about the detailed shapes of nanocrystals that have complex morphologies like the reportedly biogenic magnetite crystals in ALH64001.

Thomas-Keprta K. L. * Clemett S. J. Shimmin J. Mophew M. McIntosh J. R. Bazylinski D. A.

Kirschvink J. L. Wentworth S. J.

Three-Dimensional Morphological Analysis of ALH84001 Magnetite Using Electron Tomography [#1669]

Within experimental and numerical uncertainties the tomographic reconstruction by electron tomography reveals that some ALH84001 magnetite crystals are identical to those produced by terrestrial magnetotactic bacteria strain MV-1.

Allen C. C. * Westall F. Longazo T. Schelble R. Probst L. Flood B.

Mars Hematite Site: Potential for Preservation of Microfossils [#1005]

The Martian hematite site may be significant in the search for evidence of extraterrestrial life. Since hematite can form as an aqueous precipitate, the potential exists for preserving microfossils in ecosystems that deposit iron oxides.

Schmidgall E. R. * Moskowitz B. M. Dahlberg E. D. Kuhlman K. R.

Magnetic Analysis Techniques Applied to Desert Varnish [#2016]

A vibrating sample magnetometer (VSM) and radio frequency superconducting quantum interference device (RF SQUID) have been used to measure the properties of magnetic carriers in samples of black and red rock varnish from the Mojave Desert.

Martinez-Alonso S. * Kindel B. C. Mellon M. T. Jakosky B. M.

Spectral Variance Derived from MGS-TES Data as a Tool to Detect Hydrothermal Systems [#1805]

Life on Earth may have originated in hydrothermal areas characterized by a wide variety of mineral species, and consequently by a large spectral variance. We describe a methodology to identify areas of high spectral variance on Mars, using TES data.

Cabrol N. A. * Grin E. A. McKay C. P. Friedmann E. I. Chong Diaz G. Demergasso C. Kisse K. Grigorszky I. Ocampo-Friedmann R. Murbach M. S. Hock A. Fike D. A. Tambley C. Escudero L. deVore E. Grigsby B. H.

First Results of the Expedition to the Highest Lake on Earth: Studying a Martian Paleolake in Bolivia and the Survival Strategies Developed by Living Organisms [#1140]

We present the first results of the investigation of the biology and environment for life in the highest lake on Earth. The low oxygen, low atmospheric pressure, high-UV radiation, and average temperature make the site a close analog to Martian paleolakes. Life is thriving.

Maule J. * Steele A. Toporski J. McKay D. S.

A New Antibody for Category 1 Biomarker Detection [#2131]

Antibodies provide a new, sensitive and lightweight method to detect organics and life biomarkers during spaceflight. We have developed antibodies to a category 1 biomarker and have tested our assay successfully in martian gravity.

Tsapin A. * Kanik I. Beegle L. W. Wu L. Cooks R. G.

Determining D/L Ratios of Amino Acids Found in Ice Above Lake Vostok Using ESI/CIT Mass Spectroscopy [#1294]

The level of amino acid racemization, specifically of aspartic acid, in samples of ice from borehole drilled above lake Vostok, Antarctica obtained utilizing an electrospray ionization/cylindrical ion trap mass spectrometer will be discussed.

Parnell J. * Osinski G. R. Lee P. Pearson M. J. Feely M.

Hydrocarbons in the Haughton Impact Structure, Devon Island, Nunavut, Canada [#1118]

Hydrocarbons are recorded in the Haughton impact structure, as fluid inclusions in hydrothermal mineral veins. They were probably remobilized from host dolomites during impact-related hydrothermal activity.

Pierazzo E. * Chyba C. F.

Impact Delivery of Organics to Mars: Oblique Impacts [#1645]

Three-dimensional hydrocode simulations are carried out to investigate the effect of impact angle on the survival and delivery of organics, in particular amino acids, to Mars by cometary impacts.