Tuesday, March 15, 2005
ASTROBIOLOGY II:
MICROBES, MISSIONS, AND EARLY TERRESTRIAL LIFE
8:30 a.m.  Salon C

Chairs: N. A. Cabrol
        J. F. Lindsey

8:30 a.m.  Chafetz H. S. *
Microbially Induced Precipitates: Examples from CO	extsubscript{3}, Si-, Mn- and Fe-rich Deposits [#1084]
Microbially induced precipitates associated with terrestrial spring deposits from geographically widely
distributed sites and different element compositions provide insights with regard to the search for
extraterrestrial life.

8:45 a.m.  Xu H. F. *  Chen T.
Nano-structured Minerals as Signature of Microbial Activity [#1897]
The nanoporous magnetite and nano-fibrous calcite with unusual shape from both modern and
paleosols are directly related to microbial activity. The study provides us useful information about
possible bacterial activities on the Mars.

9:00 a.m.  Ciftcioglu N. *  McKay D. S.
Overview of Biomineralization and Nanobacteria [#1205]
Biomineralizing unique microorganism, Nanobacteria might be a good model for understanding the
environmental, physical, chemical and even immunological effects on biomineralization mechanism.

9:15 a.m.  Willis M. J. *  Ahrens T. J.  Bertani L. E.  Nash C. Z.
Survival Limits of Bacteria During Shock Compression: Application to the Early Earth [#1903]
We describe experiments in which shock recovery is performed on live E.coli bacteria in liquid.
Shocked samples are analyzed to find survival rate and damage, and results are extrapolated to impacts
on early Earth. We find 1% survival at 2.4 GPa.

9:30 a.m.  Schuerger A. C. *  Nicholson W. L.
Synergistic Effects of Low Pressure, Low Temperature, and CO	extsubscript{2} Atmospheres Inhibit the Growth of
Terrestrial Bacteria Under Simulated Martian Conditions [#1366]
Thirteen species of spore-forming and non-spore forming mesophilic bacteria that are common
spacecraft contaminants were tested under simulated Mars conditions. All bacteria were unable to
grow at 15 mb of CO	extsubscript{2} or lower, but Escherichia coli was able to grow at 25 mb.

9:45 a.m.  Fernández-Remolar D. C. *  Prieto-Ballesteros O.  Rodríguez N.  Dávila F.  Stevens T.
        Amils R.  Gómez-Elvira J.  Stoker C.
Rio Tinto Faulted Volcanosedimentary Deposits as Analog Habitats for Extant Subsurface Biospheres
on Mars: A Synthesis of the MARTE Drilling Project Geobiology Results [#1360]
Reconstruction of the probable habitats hosting the detected microbial communities through the
integration of the geobiological data obtained from the MARTE drilling campaigns, TEM sounding
and field surface geological survey.

10:00 a.m.  Mahaney W. C. *  Milner M. W.  Dohm J. M.  Baker V. R.  Netoff D.  Malloch D.
        Miyamoto H.  Hare T. M.  Komatsu G.
Piping Structures on Earth and Possibly Mars: Astrobiological Implications [#1149]
Terrestrial environments with variable compositions of microorganisms are similar to water-rich
environments on Mars that may contain fossilized or extant microbial life in similar surface or
subsurface settings.
Searching for Life with Rovers: Exploration Methods & Science Results from the 2004 Field Campaign of the “Life in the Atacama” Project and Applications to Future Mars Missions [#1244]

LITA develops and field tests a long-range automated rover and a science payload to search for microbial life in the Atacama. The Atacama’s evolution provides a unique training ground for designing and testing exploration strategies and life detection methods for the search for life on Mars.

The High Resolution Transmission Electron Microscopy: A Powerful Tool for Studying the Organization of Terrestrial and Extra-Terrestrial Carbons [#1322]

High Resolution Transmission Electron Microscopy (HRTEM) makes possible the imaging of the profile of the polyaromatic layers, allowing a knowledge of carbons, such as disordered natural carbons from meteorites and from Precambrian metasediments.

NanoSims Images of Precambrian Fossil Cells [#1314]

First NanoSims Images (carbon, nitrogen, sulfur) of 4 micron fossil cells from the Gunflint Iron Formation (2 Ga. old).

A Comparison of the Structure and Bonding of Carbon in Apex Chert Kerogenous Material and Fischer-Tropsch-Type Carbons [#1866]

Both materials are completely amorphous and show similar C=C peaks in EELS and XANES spectra, but there is an overabundance of C=O bonds in FTT carbon. It is feasible that microbial-like features in the Apex chert could be abiotic.

Characterization of a 3.5 Billion Year Old Organic Matter: Electron Paramagnetic Resonance and Pyrolysis GC-MS, Tools to Assess Syngeneity and Biogenecity [#1351]

The combination of spectroscopic and analytical techniques applied to the kerogen of the Warrawoona chert (3.5 Byr) leads to new information on the controversial question of the origin of life especially the syngeneity of the archean organic matter.

Does the Planet Drive the Biosphere? Steps Towards a Universal Biology [#1001]

Carbon isotope data from carbonates in Archean and Paleoproterozoic basin of Western Australia suggest that there is a link between the biosphere and the supercontinent cycle.