NASA ASTROBIOLOGY INSTITUTE
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Project Report: Astromaterials Focus Group

Lead Team:	***Astromaterials***
Project Title:	***Astromaterials Focus Group***
Project Investigator:	***David McKay*** [view project member list]

Project Progress

Astromaterials Focus Group

The Astromaterials Focus Group was proposed by PI David McKay in 2000 and initiated at the NAI General Meeting in 2001. The Objective of the Focus Group is to coordinate and facilitate astrobiological investigations of Mars meteorites; terrestrial analogs of potential Mars samples; sample acquisition, collection technology and procedures to advance the development of instruments and techniques for examining all astromaterials for evidence of past or present Life.

Focus group members were actively involved in the Lunar and Planetary Science Conference session titled "Carbonate and Magnetite in ALH84001" in March 2002. The Focus Group also organized the workshop titled "Magnetotactic Bacteria on Mars Earth and in ALH84001", hosted by the NASA Ames Research Center in June 2002.

The Focus Group met at the NAI General Meeting in 2003 and agreed to concentrate on the topic "Secondary Minerals in Martian Samples". Specifically, Focus Group members will promote the study of secondary minerals in meteorites from Mars. These clays, carbonates, and salts −− indicative of the interaction of water with rock on Mars −− have been identified in every Martian meteorite so far examined. As discussed in our Mars Meteorite section in the Research and Management Plan, it is extremely important to have these samples investigated by as wide a cross section of the astrobiology community as possible. Consequently, we will actively solicit and promote these studies using the Astromaterials Focus Group as a vehicle. One goal is to break out of the narrow meteorite community (which mostly lacks expertise in biology) and make the Mars meteorites much more accessible to the broad astrobiology community including both NAI members and interested investigators outside NAI.

A comprehensive study of Martian secondary minerals is particularly timely considering the three spacecraft scheduled to land on Mars within the next year. NASA's twin Mars Exploration Rovers will be the first landed spacecraft

with the capability to determine mineralogy. Their primary landing site candidates (Meridiani Planum and Gusev Crater) are both expected to show strong evidence of water−rock interactions. The European Space Agency's Beagle 2 lander is also capable of determining soil mineralogy, as well as directly measuring volatiles incorporated in the soil.

To facilitate these studies of Mars meteorites, we propose to:

- Organize, through the Astromaterials Focus Group, a Consortium Study on Martian Secondary Alteration of Nakhlites.
- Produce and document a set of petrographic thin sections of all NASA−collected Martian meteorites (initially Nakhlites), concentrating on secondary mineralization. These thin sections will be made available to researchers through the Johnson Space Center Astromaterials Acquisition and Curation Office. Secondary zones will be identified and highlighted in petrographic images.
- Work with the Smithsonian museum, the National Institute of Polar Research of Japan, and other collections to try to arrange for the loan of thin sections to add to the collection of NASA−produced thin sections.
- Organize a workshop devoted to "Secondary Minerals and Textures in Martian Rocks and Soils". The workshop will bring together researchers studying Martian meteorites and colleagues analyzing data from the Mars landers.
- Publish a workshop report, preferably a special issue of a peer−reviewed journal, containing the publications of the consortium, and papers from the mission scientists.

The consortium and workshop will be organized by David McKay, Carlton Allen, and Susan Wentworth at JSC plus other members (e.g., Laurie Leshin) of the Astromaterials Focus Group.

Roadmap Objectives

- ***Objective No. 2.1:*** Mars exploration
- ***Objective No. 7.1:*** Biosignatures to be sought in Solar System materials