PLANETARY SCIENCE RESEARCH DISCOVERIES
CosmoSparks

Quick Views of Big Advances

Looking After and Preserving NASA's Extraterrestrial Samples

Materials from space have a superb home on Earth at the Johnson Space Center (JSC) in Houston, Texas. The curators and staff in the Astromaterials Acquisition and Curation Office at JSC have the enormous and enviable responsibility for protecting, preserving, and distributing extraterrestrial samples. You might be surprised at the variety of materials and where they've come from: Comet particles; cosmic dust; meteorites from asteroids, the Moon, and Mars; rocks and soils from the Moon; and samples of the solar wind.

To find out more, take a look at the wonderful, comprehensive review by Carlton Allen (Astromaterials Curator), Judith Allton (Genesis Sample Curator), Gary Lofgren (Lunar Sample Curator), Kevin Righter (Antarctic Meteorite Curator), and Michael Zolensky (Cosmic Dust and Stardust Sample Curator) published recently in *Chemie der Erde,* the international journal for geochemistry-related topics. The curators cover, in detail, the six collections of extraterrestrial samples in their care:

- Lunar rocks and soils collected by the Apollo astronauts
- Meteorites collected on NSF-funded expeditions to Antarctica; these are samples from asteroids, the Moon, and Mars
- Cosmic dust collected by high altitude NASA aircraft
- Solar wind atoms collected by the Genesis spacecraft
- Comet particles collected by the Stardust spacecraft
- Interstellar dust particles collected by the Stardust spacecraft

The report provides details of how the samples are collected, cataloged, and stored, as well as how the laboratories and clean rooms operate. Samples are allocated under strict guidelines to qualified researchers and investigators worldwide. Upcoming acquisitions include samples from asteroid Itokawa collected by the Japan Aerospace Exploration Agency's Hayabusa spacecraft and returned to Earth in June 2010. In 2016, NASA plans to launch the OSIRIS-REx mission that will collect at least 60 grams of a near-Earth asteroid for return to Earth in 2023. The curators are also looking farther into the future, when conceivable sample-return missions may include atmospheric gases, ices or other temperature-sensitive minerals, and organic compounds in addition to rock, soil, and dust samples. Big advances in analysis techniques and instrumentation, and new generations of scientists, are making new discoveries in the extraterrestrial samples, even using the lunar rocks returned by Apollo some 40 years ago to help prove the Moon is not bone dry. The curators acknowledge in their paper, "We stand on the shoulders of giants--the far-sighted scientists who realized, during Apollo, the importance of extraterrestrial samples to the advance of scientific understanding, and who created the model for all future curation."

See:
Allen, C., Allton, J., Lofgren, G., Righter, K., and Zolensky, M. (2011) ***Curating NASA's Extraterrestrial Samples--Past, Present, and Future***. *Chemie der Erde-Geochemistry,* vol. 71(1), p. 1-20, doi: 10.1016/j.chemer.2010.12.003. [***NASA ADS entry***]. Also see ***JSC Astromaterials Acquisition and Curation Office*** and PSRD article ***Celebrated Moon Rocks***.

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