

Newly Designed SPring-8 Website:
<http://www.spring8.or.jp/en/>

Synchrotron Radiation Analysis of Comet Particles Brought Back from Space

SPring-8 played an essential part in analyzing the samples containing particles of comet origin. The samples were brought back from space in the “Stardust” mission being carried out by the National Aeronautics and Space Administration (NASA), U. S. A.

Stardust is NASA’s comet sample return mission that involves the use of a robotic spacecraft. The Stardust spacecraft launched in February 1999, succeeded in collecting samples of comet particles from Comet Wild 2, a short-period comet, in 2004, and safely returned to Earth in January 2006.

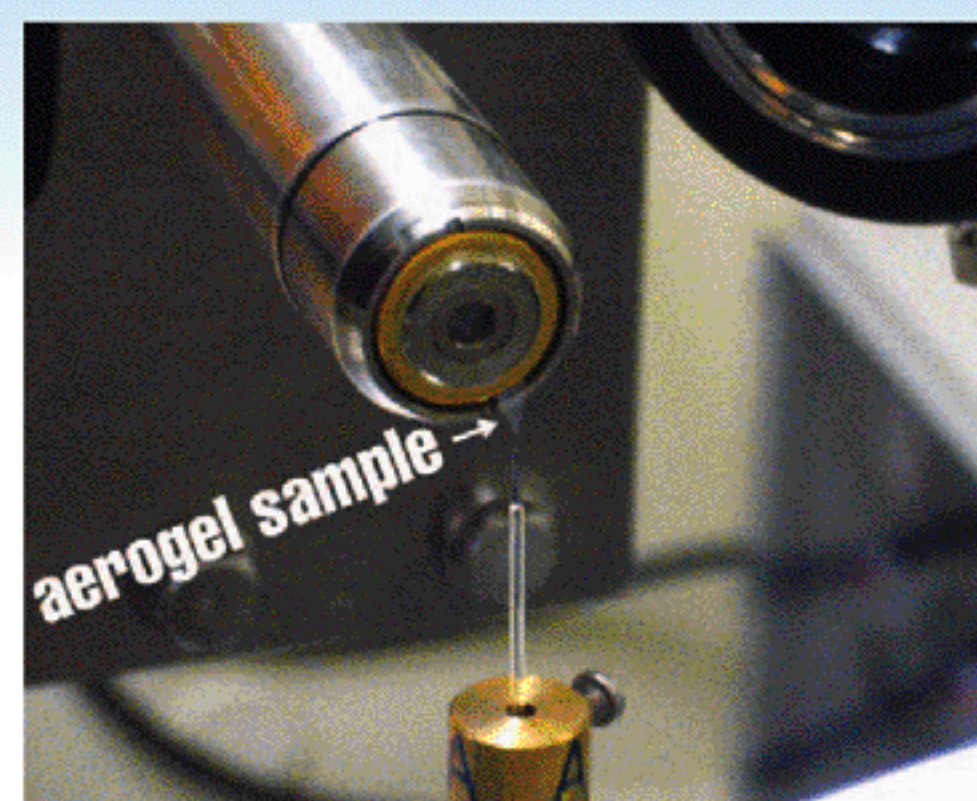
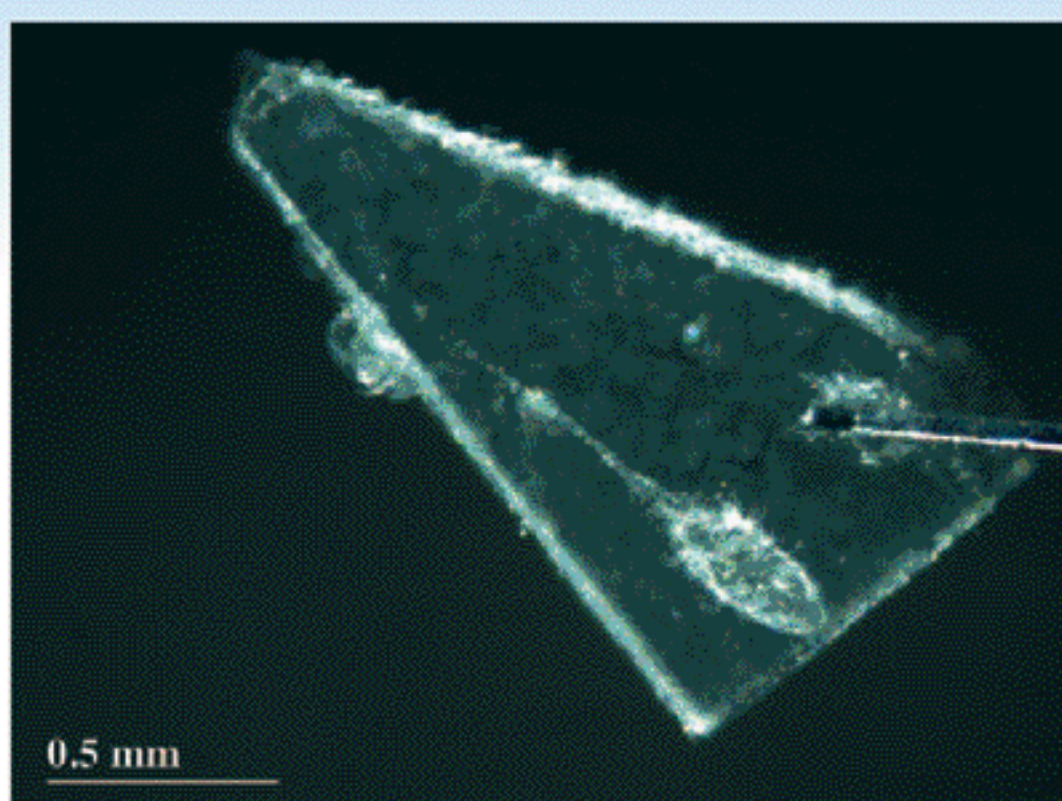
Comets are believed to be celestial bodies that possess the characteristics of the original substances that formed the building blocks of the early solar system. Analysis of the samples of comet particles, which have not been affected by Earth’s environmental pollution, is expected to provide new information, such as what raw solid materials the solar system was made of and what changes the raw solid materials underwent during the evolutionary process of the solar system up to the present. The samples of comet particles were captured into a substance called aerogel, a spongelike SiO₂ glass of markedly low density.

The preliminary examination team (PET) consisting of scientists from mainly U. S. A. has already begun its analysis of the samples of comet particles brought back by Stardust, before publicly recruited research teams conduct their analyses.

SPring-8 is best suited for analyzing minute samples, such as comet particles, of a few or a few tens of micrometers in size and of nanogram-order mass. Since March 3, 2006, the Japanese members of PET, Dr. Tomoki Nakamura from Kyushu University, Prof. Akira Tsuchiyama from Osaka University, and Prof. Kazumasa Ohsumi from KEK, and others, have brought a portion of the collected samples of comet particles to SPring-8, and have been conducting X-ray fluorescence analysis, X-ray CT, and X-ray diffraction experiments, using the HXPES-MCT Beamline (BL47XU), the Trace Element Analysis Beamline (BL37XU) and other beamlines of SPring-8, for the purpose of gaining information on the elements in the comet particles, their three-dimensional structures, and the minerals composing the particles.

Left photograph shows aerogel and an impact scar (and a track) created by a comet particle when captured in aerogel. The particle exists at the tip of its track. Comet particles both embedded in and removed from the aerogel are analyzed.

(Image: Courtesy NASA/JPL-Caltech)



Experiment at BL47XU

MEDSI 2006

The International Workshop on Mechanical Engineering Design of Synchrotron Radiation Equipment and Instrumentation (MEDSI 2006) will be held at the Egret Himeji, Hyogo, Japan, from May 24 to 26, 2006,

<http://medsi2006.spring8.or.jp/>

SRI 2006

The 9th International Conference on Synchrotron Radiation Instrumentation (SRI 2006), co-hosted by Pohang Accelerator Laboratory (PAL) and JASRI/SPring-8, will be held at the EXCO center, Daegu, Korea, from May 28 to June 3, 2006.

<http://sri2006.postech.ac.kr/>