

## Organic Carbon In Interplanetary Dust Particles

George J. Flynn; SUNY-Plattsburgh, Dept. of Physics  
Lindsay P. Keller; MVA, Inc.  
Chris Jacobsen; SUNY-Stony Brook  
Sue Wirick; SUNY-Stony Brook  
Mary A. Miller; MVA, Inc.

The accretion of interplanetary dust is believed to have made an important contribution of pre-biotic organic matter to the Earth [Anders, E., *Nature*, **342**, 255-257, 1989]. Interplanetary dust particles (IDPs), about 10 microns in size, collected from the stratosphere by NASA, contain an average of 12 weight-percent carbon [Thomas, K. L. *et al.*, *GCA*, **57**, 1551-1566, 1993]. Although polycyclic aromatic hydrocarbons (PAHs) were found in some IDPs [Clemett, S. J., *et al.*, *Science*, **262**, 721-724, 1993], others are dominated by elemental carbon. We have begun a systematic study of the types and abundances of carbon in IDPs using a Scanning Transmission X-Ray Microscope (STXM) and a Fourier Transform Infrared (FTIR) microscope, both at the National Synchrotron Light Source at Brookhaven National Laboratory. All but one of the 12 IDPs examined using the STXM have Carbon-X-ray Absorption Near-Edge Structure (C-XANES) spectra indicating the presence of significant quantities of organic carbon. The FTIR examination showed -C-H<sub>2</sub> and -C-H<sub>3</sub> stretching vibrations of aliphatic hydrocarbons in 4 of the 6 IDPs examined. These results indicate organic carbon, including aliphatic hydrocarbons, is common in IDPs. Taking a 2 weight-percent organic content, modeling indicates the accretion of IDPs currently contributes more than 10,000 kilograms/year of unpyrolyzed (not heated above 600°C) organic matter to Earth.