Geophysical Research Abstracts, Vol. 9, 09113, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-09113

Organic signature retention along hypervelocity particle impact tracks in Stardust aerogel

M. K. Spencer and R. N. Zare

Department of Chemistry, Stanford University, California, USA (mspencer@stanford.edu / Tel: 650 723 4318)

The NASA Stardust Mission brought back to Earth micron-sized particles from the coma of comet Wild2 using aerogel, a porous silica glass network, as the capture medium. Identifying which organic molecules are inherent to the cometary particles, which are modified by heating in the capture process, and which are produced from carbon contamination in the Stardust aerogel presents a major challenge in interpreting the return. Here it is shown, through two-step laser mass spectrometry (μL^2MS) analyses of organics-laden particle test shots and blank impact simulations, that the extent of particle organic alteration along impact tracks is likely dependent on particle morphology. Simulation of a "blank" impact using high-power laser pulses also shows the presence of organic compounds in Stardust witness coupon aerogel, which flew on the spacecraft but was never exposed directly to the comet. These witness coupon organics are similar in nature to those found along a Wild2 particle impact track in Stardust aerogel. We find that we cannot with confidence attribute aromatic organic compounds along the dissected impact track of a Wild2 particle in aerogel to the original organic molecules present in the cometary particle. This study highlights the need for extreme caution in interpretation of the analysis of organics captured in Stardust aerogel.