INTERPLANETARY DUST AND PARTICLES CAPTURED IN AEROGEL: FAR-INFRARED SPECTROSCOPY. L. P. Keller[1], G. J. Flynn[2], and A. J. Westphal[3], [1]Code SR, NASA/JSC, Houston, TX 77058, [2] Dept. Physics, SUNY, Plattsburgh, NY 12901, 3SSL, U. C., Berkeley, Berkeley, CA 94720.

Introduction: Far-infrared (IR) (~15-100 μm) spectroscopy provides a means of rapid, non-destructive mineralogical analysis. In this wavelength (λ) range, the position of characteristic bands for specific minerals also provides compositional information (e.g. Mg/Fe in olivines and pyroxenes). We have previously shown that far-IR measurements are possible on anhydrous interplanetary dust particles (IDPs) [1]. Here we report the first *in situ* far-IR measurements of an extraterrestrial particle captured in aerogel. The aerogel measurements are important because samples of comet dust collected in aerogel will be returned to Earth for analysis by the STARDUST mission in January of 2006.

Methods: We used a modified Spectra-Tech Irμs IR microscope installed on Beamline U4IR of the National Synchrotron Light Source (Brookhaven National Laboratory) that allows access to the full far-IR region (600-10 cm^{-1}). IDPs are analyzed on thin Formvar substrates, while the aerogel samples were self-supporting. FTIR spectra were collected in transmission mode over the λ range from 15 to 200 μm (660-50 cm^{-1}) with 4 cm^{-1} resolution and converted to absorbance for comparison purposes.

Results and Discussion: Particle "2DO3 No. 1" was extracted from aerogel flown on the ODCE collector on Mir [2]. The extraction procedure is described in [3]. The sample consists of a thin wedge "keystone" of aerogel that contains the entire particle track plus the particle (~8.5 μm in diameter) [3]. The IR measurements are compromised somewhat by saturation of the strong Si-O bending vibration from the thick aerogel substrate, but there are "windows of opportunity" both above and below the aerogel feature where crystalline silicates have diagnostic bands. After subtraction of the aerogel background, the far-IR spectra of particle 2DO3No. 1 shows three strong absorptions at 16.6, 19.6, and 24.6 μm consistent in position and intensity to an olivine (Fo75) standard (Fig. 1). These results are consistent with synchrotron X-ray fluorescence and microdiffraction data on the same particle that show a chondritic composition and X-ray diffraction lines of fayalitic olivine [4].

References: [1] Keller, L. P. and Flynn, G. J. (2003) *LPSXXXIV,* #1903. [2] Horz, F. et al. (2000) *Icarus, 147,* 559-579. [3] Westphal, A. J. et al. (2003) *LPS XXXIV,* #1826. [4] Flynn, G. J. et al. (2003) *LPS XXXIV,* #1814.

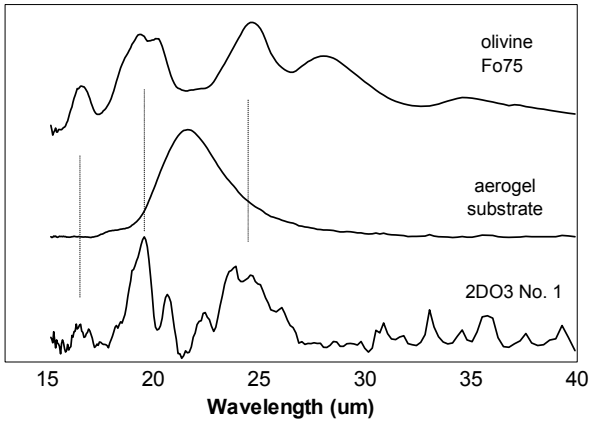

Figure 1. Far-IR spectra of an extraterrestrial particle captured in aerogel, Fo75 olivine standard, and aerogel substrate.