IDP CARBON AND MINERAL PHASE CHARACTERIZATION BY HIGH RESOLUTION CONFOCAL RAMAN IMAGING.

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Interplanetary dust particles (IDPs) are typically several microns in diameter and contain carbon and other materials bearing structure on a sub-micron scale. Confocal Raman imagery with a spatial resolution of ~250nm is used here to probe for phase identification and characterization at the small scale necessary to resolve IDP internal structure [1]. IDPs L2036v4, L2036v5, and L2036v8 have been mounted on gold foil, pressed to minimize beam scattering effects and to reveal interior structure, and imaged using a WITec CRM 200 Raman imager. A 543 nm excitation laser was used generating 10 mW power at 0.1 s per pixel scan speed. Data collected includes planar imaging and depth profiling collected through linear scans with incremental focal length adjustment.

The collected data is dominated by carbon matrix material due to masking of other phases by optically absorptive carbon [2]. Depth profile Raman measurements reveal the presence of mineral grains within the carbon matrix, and some mineral grains are exposed by the pressing technique. Graphite crystallite size is calculated using Tuinstra's method [3-6] of carbon band intensity ratio measurement, yielding a distribution of particle sizes and spatial mapping of the graphite component of the system. Spectral matching is used to identify other phases, such as metal oxides and nitrides. This data will be presented, as well as comparison between topographic imagery as collected by SEM and phase distribution as measured by Raman imagery.

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