POSTER ABSTRACT

Laser Ablation Ion Funnel (LAIF) for *In-Situ* Mass Spectrometry on Mars

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NASA has invested a great deal of resources in the development of various instruments for in situ analysis of extraterrestrial bodies. As a result, there currently exists a wealth of instrumentation suitable for detailed in situ analytical investigation. One common characteristic among the majority of these instruments is that they require extensive sample handling in order to extract and ionize atoms and/or molecules, before interrogation by the instrument in question can take place. A promising means of reducing the complexity of the sample handling required by instruments such as those discussed above is to employ laser ablation ionization. Laser ablation is a very attractive technique for in situ ionization of rock and soil samples since a laser is able to sample the surface of a rock or soil with minimal manipulation of the sample and no sample preparation. We are developing a front-end instrument that will exploit the advantages of laser ablation ionization while avoiding the pitfalls discussed above. This instrument, namely the laser ablation-ion funnel (LAIF), ionizes rock and soil samples in the ambient Martian environment with no sample preparation. The LAIF then efficiently captures transports and injects the product ions into a mass spectrometer for in situ analysis. We have demonstrated the operation of the LAIF in a simulated Martian atmosphere of 5 Torr CO2, and will present mass spectra of several different mineral samples obtained with the LAIF interfaced to a commercial ion trap mass spectrometer (LCQ Deca XP). We also present preliminary results examining the influence of laser power on the ionization process.