VNIR SPECTRAL PROPERTIES OF MARTIAN METEORITES AND COMPARISON WITH CRISM SPECTRA OF MARS IN THE ISIDIS BASIN REGION.

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Introduction: The spectral properties of Martian meteorites provide a source of crustal Martian rocks for ground truthing orbital data. Coordinated VNIR and mid-IR spectral analyses of the meteorites and mineralogy of Mars are important for understanding the composition of the surface [e.g. 1,2]. Analyses of the VNIR and mid-IR spectral properties of several Martian meteorites were presented recently and coordinated with the mafic outcrops on the surface of Mars [3]. Here we focus on the VNIR reflectance spectra of ALH 84001, EETA 79001, Los Angeles, Dar al Gani 670, and NWA 1068 and compare these with CRISM spectra of mafic outcrops in the Libya Montes regions, south of Isidis Basin on Mars. Basaltic crustal rocks are exposed in the Libya Montes region exhibiting a variety of spectral signatures [4]. However, in many cases the spectra of these basaltic rocks are more consistent with the spectra of meteorites and other basaltic rocks than with spectra of pure minerals.

Spectral Properties of Martian Meteorites: The meteorites studied contain pyroxenes (ranging from orthopyroxene to pigeonite to augite), feldspar (and maskelynite), fayalitic and fosteritic olivine, silica, and glass. Their VNIR reflectance spectra contain distinct bands near 1 and 2 µm for samples dominated by pyroxene. Others exhibit only a broad band near 0.8-1.2 µm that is representative of a mixture of the olivine, pyroxene, feldspar, and basaltic glass [3].

Mafic Outcrops at Libya Montes: Mafic outcrops are observed across the surface of Mars in non-dusty areas where the caprock has been eroded. The Libya Montes region features exposures of ancient crustal rocks, olivine-rich melt rocks and/or volcanic flows, and phyllosilicate- and carbonate-bearing altered rocks [4]. CRISM spectra of exposed mafic rocks include a strong, broad band from 0.9-1.3 µm characteristic of olivine, as well as weaker bands near 1 µm that are attributed to a mixture of mafic components [4]. In this study we are coordinating the VNIR lab spectra of several Martian meteorites with CRISM spectra of the mafic outcrops in order to place constraints on the mineralogy of the ancient crustal rocks and other basaltic outcrops.

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