CONSTRAINTS ON MAPPING SOURCE REGIONS OF MARTIAN METEORITES AND THE DISTRIBUTION OF PYROXENE ON MARS: IR MICROSPECTROSCOPY OF PYROXENE IN SHERGOTTITES. G.K. Benedix[1] and V.E. Hamilton[2], [1]Dept. of Mineralogy, The Natural History Museum, Cromwell Road, London, UK SW7 5BD (g.benedix@nhm.ac.uk); [2]Southwest Research Institute, 1050 Walnut St., Suite 300, Boulder, CO 80302, hamilton@boulder.swri.edu

Introduction: The surface mineralogy of Mars is constrained by spectral and chemical data from orbiters and landers. One technique for determining lithologies is thermal emission spectroscopy. Virtually the entire surface of Mars has been mapped using either the TES [1] or THEMIS [2] instruments and the Mini-TES has made *in situ* measurements [e.g. 3]. These data have been used to try and find source regions of Martian meteorites[e.g. 4]. Other studies have shown that pigeonite is the dominant low-Ca pyroxene in Mars [5,6]. Pigeonite is important in shergottites and on the surface of mars. At present, there is only one pigeonite spectrum in the ASU spectral library [7].

Microspectroscopy [e.g., 8] allows expansion of databases to include minerals for which it is difficult to obtain physical separates, but which are accessible in meteorite thin sections. Preliminary spectral measurements [9,10] using an infrared microscope attached to a benchtop FT-IR examined chips or thick sections of meteorites or terrestrial rocks. Using a similar system, we measured Martian meteorite pyroxene in thin section [11].

Samples and Analytical Techniques: Bi-directional reflectance spectra from 2.5 to 14 µm of pyroxenes in thin sections of Zagami and Los Angeles were acquired using a Perkin Elmer AutoIMAGE FT-IR microscope attached to the SpectrumOne FT-IR spectrometer (aperture = 25 µm; spectral resolution = 4cm^{-1}; and polished gold calibration standard). Mineral compositions were determined by electron microprobe.

Results and Discussion: Zagami and Los Angeles both contain pigeonite and augite with variable composition (Wo_{10} to Wo_{18} and wide-ranging Fe-Mg). Despite the range of compositions seen, the average pigeonite spectrum of Zagami shares a similar shape (although not intensity due to the presence of other minerals) with the whole rock spectrum. There is some evidence that pyroxenes in Zagami have a preferred orientation. To address this, we will use electron backscatter diffraction (EBSD) to determine exact orientation relationships of grains.

Pigeonite composition in Los Angeles is also variable. The shape of the averaged spectrum from randomly measured pigeonite grains matches the overall shape of the whole rock spectrum. It appears that the best pyroxene spectrum to use for basaltic meteorites from Mars is an average of many compositions.

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