ANOMALOUS NIR SPECTRA OF HIGH-Ca PYROXENES: POSSIBLE CORRELATION WITH EXSOLVED PHASES. E. J. Hoffman[1] and E.A. Cloutis[2]. [1]Physics Department, Morgan State University, Baltimore, MD 21251, USA (ehoffman@morgan.edu). [2]Department of Geography, University of Winnipeg, 515 Portage Ave., Winnipeg, Manitoba R3B 2E9, CANADA.

Introduction: Near-infrared (NIR) reflectance spectroscopy is a principal tool in the study of igneous planetary material whether remote or in the laboratory. Mössbauer spectroscopy has often provided a useful supplement in the lab and has now become a component of rover missions as well. It is thus ever more urgent to resolve outstanding spectroscopic ambiguities.

For high-Ca pyroxenes some NIR spectra show anomalous results ("Type B") as if Fe^{2+} ion were in the larger (M2) octahedral site where Ca^{2+} is known to be; in some cases samples of almost identical composition give contrasting NIR results [1]. Mössbauer spectra of such matched sets have also shown anomalous results, unexpectedly suggesting higher Fe^{3+} content than that found by chemical analysis [2]. We are continuing work coupling NIR and Mössbauer spectroscopy for matched sets of high-Ca pyroxenes and here present initial efforts toward testing the role of exsolved phases in producing the observed anomalies.

Materials: The samples are 36 terrestrial high-Ca pyroxenes in 12 sets of two or more each. Compositions within a set are very similar. A total of 12 samples show "normal" (Type A) spectra, 16 anomalous (Type B), and 8 intermediate or uncertain patterns. Compositions were determined by electron microprobe, with Fe^{2+} and Fe^{3+} by wet chemistry. Most of these have been previously published along with their NIR spectra [1, 4]. X-Ray diffraction (XRD) patterns exist for some of them and are being re-examined.

Procedure: Exsolved phases, in addition to pyroxene polymorphs, can include oxides, especially chromite [3]. Whether Fe-bearing silicate or oxide, these exsolved phases could account for the Mössbauer anomaly and perhaps for the unusual NIR absorption also. We are examining this possibility by considering composition, XRD, Mössbauer spectroscopy at low temperature, and more detailed microscopic analysis. Some experimental work may also be warranted.

Preliminary results, Cr content: Table 1 is consistent with the possibility that chromite exsolution plays a role.

Table 1. Cr per 6 O for 36 high-Ca pyroxenes

Samples:	All	Uncertain	Normal (A)	Anomalous(B)
n:	36	8	12	16
Mean:	0.00506	0.00175	0.00350	0.00756

The ratio of average Cr in anomalous to that in normal samples is 756/350 = 2.16, a highly suggestive figure.

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