Supplemental Material

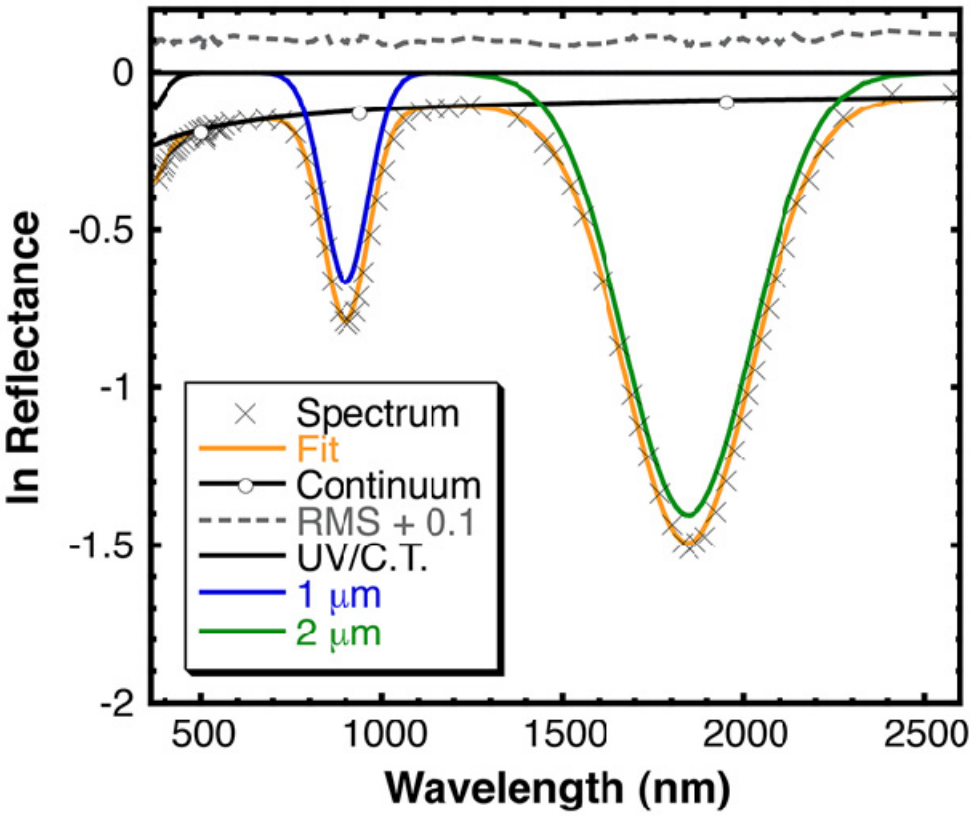

Figure 9: Example Modified Gaussian Model (MGM) fit to an orthopyroxene spectrum. The spectrum shown is the example provided with the MGM software (http://www.planetary.brown.edu/mgm/). This example illustrates how the MGM deconvolves a spectrum into its individual component absorption features superimposed on a continuum slope. The orthopyroxene spectrum is simple, and can be described by two primary absorption features near 1 and 2 μm, as well as a short-wavelength feature to capture the charge-transfer absorption in the ultraviolet. Many applications of the MGM, such as many shown below, are more complex, as they may require multiple Gaussians are required to characterize an absorption feature because multiple electronic transitions are responsible for producing the absorption feature. Examples of such multi-component absorptions include the olivine 1 μm absorption

(Sunshine and Pieters 1998) and the spinel 2 μm absorption (Sunshine and Cloutis 1999; Cloutis et al. 2004).

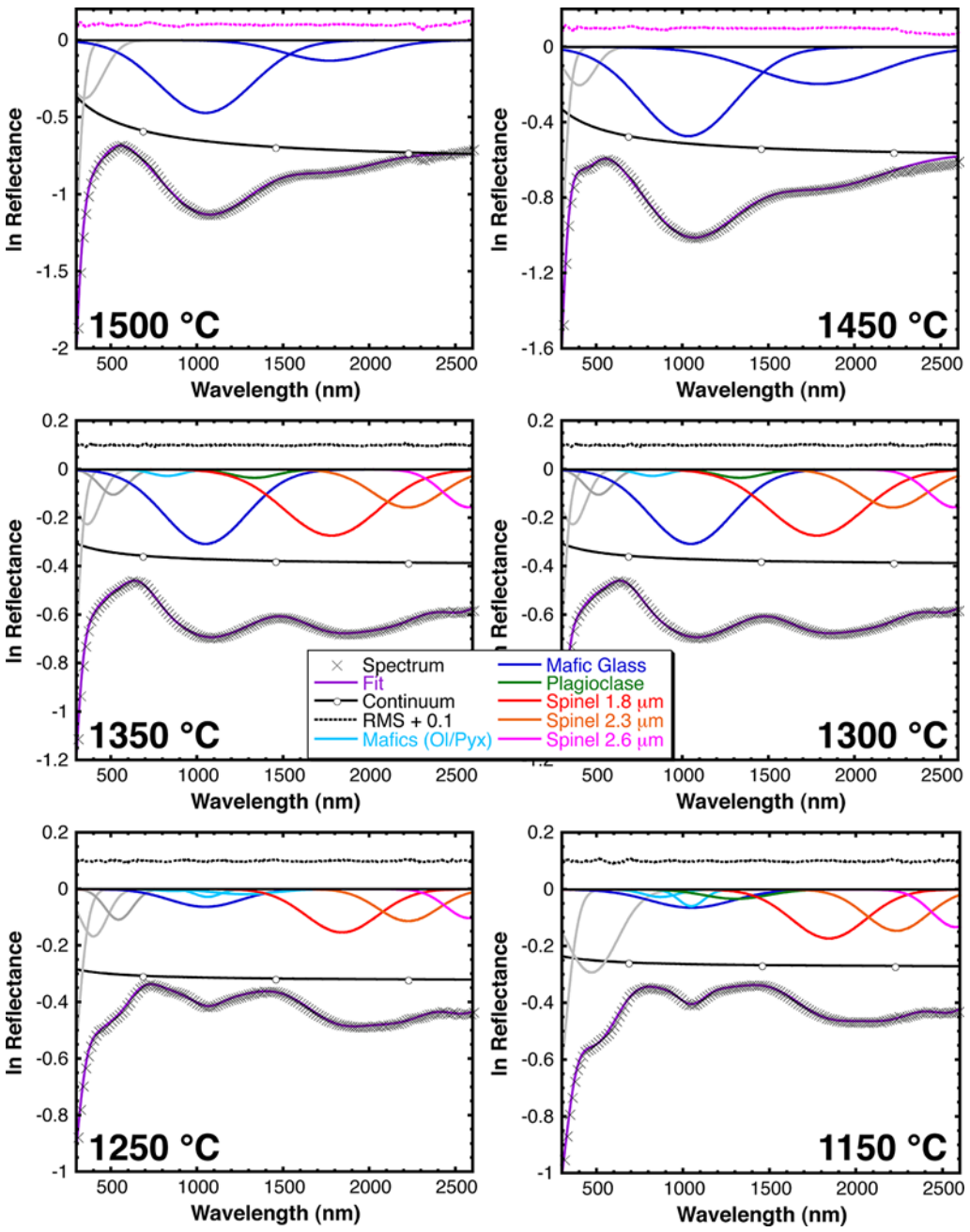

Figure 10: Modified Gaussian Model (MGM) fits to AT-65785 sequence reflectance spectra. Each spectrum is deconvolved into its component absorptions using the MGM approach of Sunshine et al. (1990). The spinel feature near 2 μm is composed of three distinct absorptions

(Sunshine and Cloutis, 1999), shown in red, orange, and magenta. The effect of the mafic glass is apparent in the spinel 1.8 μm absorption (red lines), which falls at shorter wavelength and with greater intensity in the more glass-rich samples (1300 °C and 1350 °C), as discussed in the text. The spectral contributions of the modally minor (olivine/pyroxene/plagioclase) phases are apparent in the weak absorptions (cyan and green lines) in the near-infrared region (near 1000 nm). Note that noise in the high temperature (1450 °C and 1500 °C) samples necessitated truncating those spectra at ~2.25 μm in performing the fits, although the full spectrum is shown in this figure.

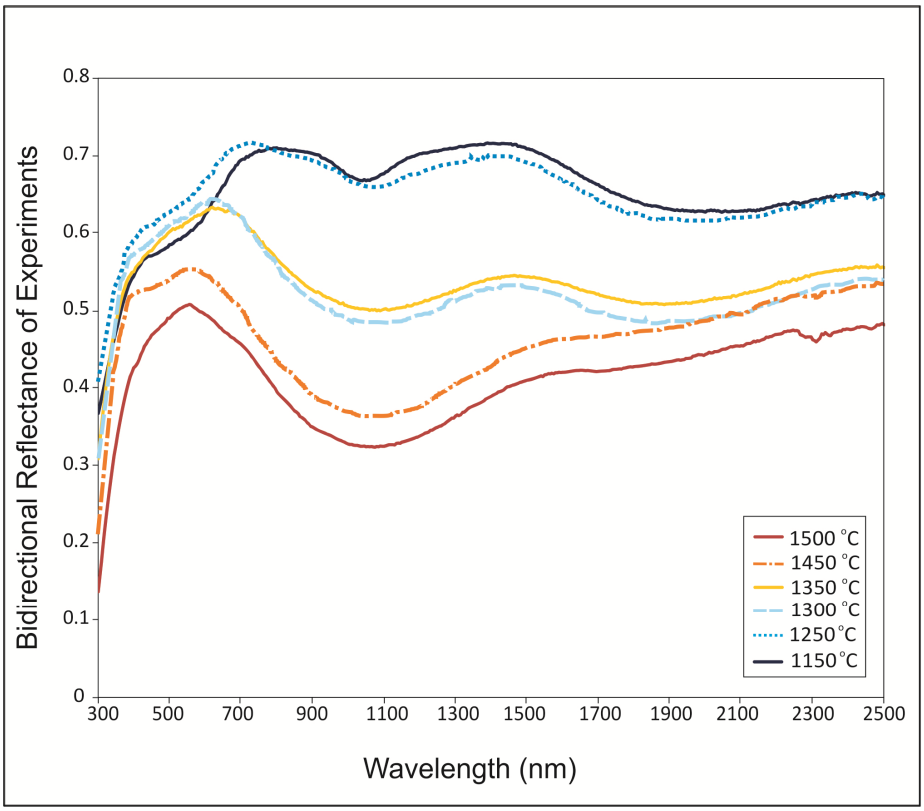

Figure 11: Reflectance spectra of the experimental charges with no normalization.