REFLECTANCE SPECTRA COMPARISONS OF AN ALLENDE DARK INCLUSION AND ASTEROIDS

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Introduction: Several studies have previously described the petrography, mineral chemistry, and petrology of dark inclusions from Allende [e.g., 1,2,3,4]. Increasing numbers of high-quality reflectance spectra of K-complex asteroids, which have been suggested to represent various types of carbonaceous chondrite meteorites, have recently become available [e.g., 5]. Hence, it seemed important to us to compare these data with laboratory-derived reflectance spectra and mineralogical data of Allende dark inclusions to determine if any of these clasts might serve as petrologic analogues for asteroids.

Data: MZA is a large Type B dark inclusion composed of chondrule-like aggregates of fine-grained olivine in an opaque matrix that also is in large part composed of fine-grained olivine with minor pyroxene and opaques. Type B dark inclusions have been interpreted as the product of aqueous alteration of CV-type material followed by dehydration [e.g., 2,3,4]. Other workers [e.g., 1] have interpreted these clasts as the result of nebular processes. Electron microprobe analyses of fine-grained olivine from clast MZA indicate an average olivine composition of $Fo_{58.2}$. This agrees well with X-ray diffraction analysis of a bulk sample of the dark inclusion, which indicates an approximate average olivine composition of Fo_{54}.

The laboratory-derived reflectance spectrum of MZA has a distinctive M2 band at approximately 1.05μm. Based on the work of Sunshine and Pieters [5], the location of this stable M2 band is consistent with an average olivine composition of $Fo_{50\text{-}60}$. This laboratory-derived spectrum is distinctly different from that of Allende and some other CV3 meteorites [e.g., 6]. Among the K-complex asteroids, this spectrum is most similar to that of 661 Cloelia [6]. Ironically, the spectrum of MZA is also very similar to that of the A-type asteroid 446 Aetemitas with almost identical location of M2 band and similar spectral features [7,8].

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