CK AND CV CARBONACEOUS CHONDRITES REFLECTANCE PROPERTIES COMPARED WITH THE Cg- ASTEROID CLASS

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Introduction: Establishing the parent bodies of carbonaceous chondrites (hereafter CCs) and primitive asteroids has proven to be an issue full of difficulties [1-3]. However, we know that the parent bodies of these meteorites are some of the darkest objects of our Solar System, as shown by the reflectance spectra of CCs, usually decreased in reflectance due to their fine-grained matrix, which contains opaque and darkened materials [2-6]. In fact, CCs are samples of km-sized undifferentiated objects that broke after collisions [7-8].We previously analyzed the spectral features of pristine carbonaceous chondrites and their implications for the remote characterization of dark primitive asteroids for future sample-return missions [2-3]. We also compared CK chondrite and asteroids spectra in the ultraviolet to near-infrared range (or UV-NIR, 0.3 to 2.6 µm) [2], here we focus in a more precise study of the CK carbonaceous chondrites and a possible progressive evolution involving CV meteorites and Cg-type asteroids (Fig. 1).

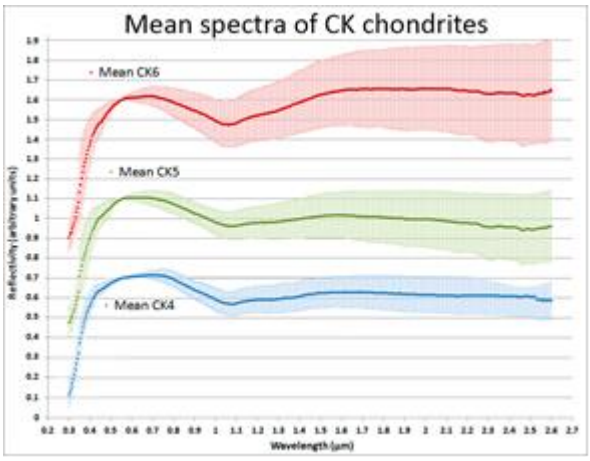

Figura 1: Mean CK petrologic types spectra. Mean CK4 includes CK4/5; Mean CK5 includes CK4/5 and CK5/6; Mean CK6 includes CK5/6. The error bars are 1σ. Mean CK4 is the mean of 14 spectra of 5 different meteorites. Mean CK5 is the mean of 11 spectra of 6 different meteorites. Mean CK6 is the mean of 11 spectra of 2 different meteorites. The spectra are vertically shifted to avoid superposition.

Results and discusion: We combined the spectra from the RELAB database with the Bus-DeMeo Taxonomy Classification tool. That allowed us to see that while the overall shape of most CK spectra seems to be similar to K-type asteroids, but they are usually much bluer. We also found some consistency with Cg-type asteroids between 0.5 and 0.8 µm. Indeed, a mixture of K and Cg-type asteroids, after some processing, could be considered a good match for CK meteorites. We will continue exploring CV and CK petrologic types and describing the shock transition between one group and another in view of the invoked relationship among them [9]. CK chondrites are gradationally metamorphosed CV chondrites that could explain the natural variation between Cg-type asteroids. In general, CKs are highly oxidized meteorites and more shocked comparatively with CVs, showing a higher degree of thermal metamorphism [9]. We expect that part of this behavior is shock-induced, so we are identifying plausible minerals associated with such processes [10]. The CKs have been tentatively related to asteroids before [11], but no definitive correlation exists yet. We think that a deeper insight on the effect of impact darkening in carbonaceous chondrites could be of particular interest in the context of the Hayabusa 2 mission, which will return samples from the rare Cg-type asteroid (162173) 1999 JU3.

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