CK CARBONACEOUS CHONDRITES REFLECTANCE SPECTRA IN THE 0.3 TO 2.6 μm RANGE: IMPLICATIONS FOR SAMPLE-RETURN MISSIONS

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Introduction: 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 [1]. 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 (hereafter CCs) and a possible progressive evolution also involving CV meteorites and Cg-type asteroids.

Establishing a proper spectral correlation between CCs and asteroids has proven to be an issue full of difficulties. However, we know nowadays 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 matrix, which contains darkened materials [3,4]. In fact, CCs are samples of km-sized undifferentiated objects that broke after collisions [5].

The highly oxidized meteorites of the CK group are similar in composition to CVs and COs, although showing a higher degree of metamorphism [4]. We expect that part of this has been shock-induced, so we are identifying plausible minerals associated with such processes [8]. The CKs have been tentatively related to asteroids before [7,8], but no definitive correlation exists yet.

Results and discussion: 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 reminds to K-type asteroids, they are usually much bluer. And, as shown before [2], there is 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. Therefore, a deeper insight on this subject would 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.

References: [1] Trigo-Rodríguez J. M. et al. 2014. *MNRAS* 437: 227-240. [2] Moyano-Cambero C. E. et al. 2015.. 46th LPSC, abstract #1106. [3] Cloutis E. A. et al. 2011. *Icarus* 212: 180-209. [4] Cloutis E. A. et al. 2012. *Icarus* 221: 911-924. [5] Chapman C. R. et al. 1975. *Icarus* 25: 104-130. [6] Urzaiz M. et al. 2015. 46th LPSC, abstract #1785. [7] Mothé-Diniz T. et al. 2008. *Icarus* 195: 277-294. [8] Bell J. F. 1988 *Meteoritics* 23: 256-257.