

New compositional proposals to asteroid (121) Hermione based on spectroscopic and photometric analysis.

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Abstract

(121) Hermione is a Cybele group asteroid discovered in 1872 with a km-size moonlet detected in 2002. Based on bulk density ($1.4 \pm 0.2 \text{ g/cm}^3$) and albedo values, the derived Hermione's taxonomic class is C-type with a low albedo, making the CI and CM carbonaceous chondrites the best meteoritic analogs. Nowadays our knowledge on the mineralogy of asteroids is based on remote-sensing photometry and spectroscopy in the visible and near-infrared, radar polarimetry and comparison with meteorites studied in the laboratory. Spectral observations of Hermione at VIS-NIR wavelengths will help to refine its taxonomic classification and state of weathering. In this work we review the mineralogy assignation of Hermione comparing JPL spectral libraries of minerals and meteorites (ultramafic rocks, pyrites, piroxenes, diamonds, olivine, hematites, carbons and carbonaceous meteorites) resampled to the wavelengths of VIS-NIR spectrum of Hermione from SMASSII. In order to quantify similarities between resampled spectra and Hermione SMASSII spectrum, we performed a Factor Análisis (PCA). The same analysis was carried out with spectra resampled to wavelengths of 367, 436, 545, 638 and 797 nm, which correspond to effective central wavelengths of U, B, V, R and I photometric filters used to observe (121) Hermione from ICTEA observatory (mpc code L94). Pyrite, Sphalerite and Goethite are the mineral species with more similar spectra to Hermione's SMASSII spectrum. In the same way, chondrite carbonaceous and troillite are the meteorites more similar. The same results were found using our photometric analysis, but olivine also was included in the same group of (121) Hermione.

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