

IRRADIATION OF METEORITES: DECODING SPACE WEATHERING ON LOW ALBEDO ASTEROIDS

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Space weathering (SpWe) processes such as micrometeorite bombardment or solar wind ion irradiation produce changes on the surface of airless bodies, impeding us to decipher their composition from their spectra. This effect has been widely studied for the case of the Moon and S-type asteroids and is now investigated for primitive asteroids [1]. In order to understand the influence of SpWe on carbonaceous materials and to support current sample return missions (Hayabusa2/JAXA and OSIRIS-REx/NASA), we perform ion irradiation of carbonaceous chondrites (CCs) as a simulation of solar wind irradiation of C-complex asteroids. We use reflectance spectroscopy (0.4-16 μ m) to probe our samples. We studied several types of CCs [2-4] as they span a wide range of albedos (from 2-5% for CI/CM to 15-18% for CV/CO), initial composition (matrix- or chondrules-rich) and did not suffer the same thermal history (aqueous alteration or metamorphism). We proposed new insights on the effects of SpWe on low albedo asteroids based on these experiments. We are performing new irradiation experiments on other meteorites (CK, CR and CM with different degrees of aqueous alteration) to test further our model. We will present the new results at the time of conference and discuss them regarding our previous study. Micro-reflectance spectra were also acquired (2.5-12 μ m) using a spot size of 20 μ m and scanning large areas (from mm² to cm²) of the samples (13 mm diameter pellets), both on virgin and irradiated areas. Spectral maps allow us characterizing the heterogeneity of the meteorites at the 20 μ m spatial scale [5].

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