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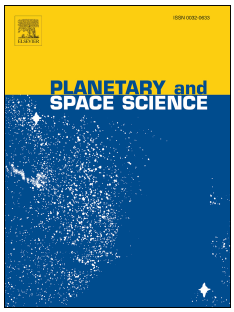

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Bidirectional reflectance of laboratory cometary analogues to interpret the spectrophotometric properties of the nucleus of comet 67P/Churyumov-Gerasimenko

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Abstract

In this work we provide measurements of the bidirectional reflectance in the VIS-NIR spectral range for a selection of laboratory samples to deduce parameters such as their visible spectrum, phase curve, hemispheric albedo and phase reddening. The aim is to simulate the reflectance of the comet nucleus in order to aid the interpretation of data from the surface of comet 67P/Churyumov-Gerasimenko (67P) acquired by the Rosetta OSIRIS imaging system. We produced a broad variety of well characterised and reproducible samples containing water ice, carbonaceous compounds and complex organic molecules. We were able to reproduce the individual global spectrophotometric parameters (albedo, spectrum, phase reddening, phase curve) of 67P by using mixtures of activated charcoal, tholins and water ice. However, no mixture was able to fit all parameters simultaneously. The samples with highest porosities best match the phase curve of 67P. Spectral considerations from our experiments show that the parti-

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