



Space weathering of small Solar System bodies: the case of carbon-rich objects

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Abstract

Micrometeorite bombardment and irradiation by solar wind and cosmic ions cause variations in the optical properties of the small Solar System bodies surface materials.

In this presentation I will discuss some aspects of the space weathering of carbon-rich objects (Trans-Neptunian Objects, comets, primitive asteroids, etc.), based on experiments performed on meteorites and on minor bodies surface analogues (ices, organics, refractory carbons) produced in the laboratory, and applications to the interpretation of the observations.

I will show visible-IR and Raman spectra of soot, amorphous carbons, and organic residues, and discuss their variations induced by ion irradiation as a consequence of variations of their chemical (e.g. loss of hydrogen, sp^2/sp^3 ratio), optical (e.g. variation of the optical gap), and structural (e.g. bond disorder, crystallites size) properties.

In particular, visible-NIR color variations will be documented in view of their application to mimic the spectra of outer Solar System objects. The strong dependence of the weathering process on the original composition will be discussed.