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A possible laboratory analog to cometary matter

J. Blum, R. Schräpler, M. Krause

Institut für Geophysik und extraterrestrische Physik, Technische Universität Braunschweig, Germany (j.blum@tu-bs.de, r.schraepler@tu-bs.de, maya.krause@tu-bs.de)

We have recently been able to produce monolithic, high-porosity dust aggregates with 2.5 cm diameter and heights up to 1.5 cm. The constituent dust particles are typically micrometer-sized and the porosities of the macroscopic bodies range from 85% for monodisperse, spherical monomers to 93% for irregular monomer grains with a wide size distribution. Uniaxial compression, mimicking low- to intermediate-velocity impacts, reduces the porosity to 67%-80%. Thus, the porosity range matches the one found for comets and cometary meteoroids. In addition to that, tensile-strength measurements of our laboratory samples showed values in the kPa range, similar to those found for disintegrating comets. We are currently setting up an experiment to measure the heat conductivity of our macroscopic dust aggregates. Our samples can be useful for laboratory simulations of sampling and in-situ investigations of cometary surfaces.