



Micrometeoroid ablation simulated in the laboratory

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A facility is developed to simulate the ablation of micrometeoroids in laboratory conditions, which also allows measuring the ionization probability of the ablated material. An electrostatic dust accelerator is used to generate iron and meteoric analog particles with velocities 10-50 km/s. The particles are then introduced into a cell filled with nitrogen, air or carbon dioxide gas with pressures adjustable in the 0.02 – 0.5 Torr range, where the partial or complete ablation of the particle occurs over a short distance. An array of biased electrodes is used to collect the ionized products with spatial resolution along the ablating particles' path, allowing thus the study of the temporal resolution of the process. A simple ablation model is used to match the observations. For completely ablated particles the total collected charge directly yields the ionization efficiency for. The measurements using iron particles in N₂ and air are in relatively good agreement with earlier data. The measurements with CO₂ and He gases, however, are significantly different from the expectations.