

Measurements of Polyatomic Molecule Formation on an Icy Grain Analog Using Fast Atoms

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Abstract

Measurements are reported for production of CO₂ resulting from the impact of a monoenergetic O(3P) beam upon a surface cooled to 4.8 K and covered with a CO ice. Using temperature-programmed desorption and mass spectrometer detection, one clearly detects increasing amounts of CO₂ formation with O(3P) energies of 2, 5, 10, and 14 eV. This is the first measurement of polyatomic molecule formation on a surface with superthermal atoms. The chosen surface coverage, surface temperature, and superthermal atom energy simulate conditions in shock-heated circumstellar and interstellar regions.

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