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UV Photodissociation of SO_2 Before Oxygenation of the Early Earth Atmosphere[1] PAUL B. DISS, ANDREW J. POMMERSHEIM, AMY S. MULLIN, Univ of Maryland-College Park — The photodissociation dynamics from vibronically excited SO_2 molecules is investigated using tunable, pulsed UV light (210-220 nm) and state-resolved high-resolution transient IR absorption spectroscopy. Dissociation is initiated with the tunable UV light and the photofragments are probed with 4.4 μm (2230-2300 cm^{-1}) light. Individual Doppler-broadened rovibrational states were measured to get nascent translational energy distributions, rotational energy, and branching ratios of the SO photofragments. Measurements near the UV photodissociation threshold shed light onto the quantum yield of the photofragments from the excited SO_2 molecule. UV-wavelength-dependent studies of product energy partitioning are done to investigate and characterize the dissociation dynamics of predissociative states resulting from non-adiabatic coupling. The results of this research give insight to unusual sulfur isotope effects seen in the early earth rock record attributed to UV photochemistry of SO_2.

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