EXAMINING PREBIOTIC CHEMISTRY USING O(^{1}D) INSERTION REACTIONS

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Aminomethanol, methanediol, and methoxymethanol are all prebiotic molecules expected to form via photo-driven grain surface chemistry in the interstellar medium (ISM). These molecules are expected to be precursors for larger, biologically-relevant molecules in the ISM such as sugars and amino acids. These three molecules have not yet been detected in the ISM because of the lack of available rotational spectra. A high resolution (sub)millimeter spectrometer coupled to a molecular source is being used to study these molecules using O(^{1}D) insertion reactions. The O(^{1}D) chemistry is initiated using an excimer laser, and the products of the insertion reactions are adiabatically cooled using a supersonic expansion. Experimental parameters are being optimized by examination of methanol formed from O(^{1}D) insertion into methane. Theoretical studies of the structure and reaction energies for aminomethanol, methanediol, and methoxymethanol have been conducted to guide the laboratory studies once the methanol experiment has been optimized. The results of the calculations and initial experimental results will be presented.