CHIRPED PULSE MICROWAVE SPECTROSCOPY IN PULSED UNIFORM SUPERSONIC FLOWS: OBSERVATION OF K-DEPENDENT RATES IN THE CL + PROPYNE REACTION

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Chirped-Pulse Fourier-transform microwave spectroscopy in uniform supersonic flows (CPUF) has been applied to study the reaction of Cl atoms with propyne. The approach utilizes broad-band microwave spectroscopy to extract structural information with MHz resolution and near universal detection, in conjunction with a Laval flow system, which offers thermalized conditions at low temperatures and high number densities. Our previous studies have exploited this approach to obtain multichannel product branching fractions in a number of polyatomic systems, with isomer and often vibrational level specificity. This report highlights an additional capability of the CPUF technique: here, the state-specific reactant depletion is directly monitored on a microsecond timescale. In doing so, a clear dependence on the rotational quantum number K in the rate of the reaction between Cl atoms and propyne is revealed. Future prospects for the technique will be discussed.