VIBRATIONAL MEDIATION IN THE C-H STRETCH C-D STRETCH COMBINATION REGION OF CH_3D

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The hydrogen-abstraction reaction of CH_3D with Cl atoms is the current focus of our lab, with the goal of understanding the role vibrational enhancement plays in promoting and directing a reaction. Our most recent experimental work to this end involves vibrational excitation in the C-H stretch C-D stretch combination ($|100>|1>$) region. These two stretches represent dissimilar nuclear motions previously studied separately, but not together. By using action spectroscopy and product distributions, we glean information on how this excitation affects the abstraction reaction. We see both C-D stretch excited CH_2D and C-H stretch excited CH_3 products, providing further evidence for the previously established spectator model. Our action spectra also give us the relative reactivity of the three states ($\nu_1 + \nu_2$, $\nu_4 + \nu_2$, and $2\nu_5 + \nu_2$) found in this region.