Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Imaging predissociation dynamics and energy flow pathways in vibrationally excited acetylene-HCl dimers GUOSHENG LI, JESSICA PARR, IGOR FEDOROV, HANNA REISLER, University of Southern California — We report photofragment imaging studies of the predissociation of acetylene-HCl dimers. The dimer is vibrationally excited by laser irradiation either in the CH asymmetric stretch mode of the acetylene subunit or in the HCl subunit. Photofragment ion images of HCl in specific rotational states are obtained from which kinetic energy release patterns are analyzed. The predissociation behavior in the two cases is different. CH stretch excitation is followed by IVR in acetylene and results in an acetylene fragment with one quantum of CC stretch excitation (in agreement with results of Roger Miller and coworkers) and a statistical rotational energy distribution. HCl excitation results in acetylene fragments with one or two quanta of bending excitation with no clear preference for a specific mode. In both cases HCl rotations are nonstatistical. The different predissociation outcomes reflect the different energy flow pathways followed in each case. Research supported by the US National Science Foundation.

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Date submitted: 28 Nov 2005 Electronic form version 1.4