VIBRONIC SPECTROSCOPY OF THE PHENYLCYANOMETHYL RADICAL

DEEPALI N. MEHTA, NATHANAEL M. KIDWELL, and TIMOTHY S. ZWIER, *Department of Chemistry, Purdue University, West Lafayette, IN 47907*.

Resonance stabilized radicals (RSRs) are thought to be key intermediates in the formation of larger molecules in planetary atmospheres. Given the nitrogen-rich atmosphere of Titan, and the prevalence of nitriles there, it is likely that nitrile and isonitrile RSRs could be especially important in pathways leading to the formation of more complex nitrogen-containing compounds and the aerosols (tholins) that are ultimately produced. In this talk, the results of a gas phase, jet-cooled vibronic spectroscopy study of the phenylcyanomethyl radical ($C_6H_5\dot{C}HCN$), the nitrogen-containing analog of the 1-phenylpropargyl radical, will be presented. A resonant two color photon ionization spectrum over the range 21,350-22,200 cm^{-1} (450.0-468.0 nm) has been recorded, and the D_0-D_1 origin band has been tentatively identified at 21,400 cm^{-1}. Studies identifying the ionization threshold, and characterizing the vibronic structure will also be presented. An analogous study of the phenylisocyanomethyl radical, $C_6H_5\dot{C}HNC$, is currently being pursued for comparison with that of phenylcyanomethyl radical.