UV PHOTODISSOCIATION OF CYCLIC KETONES IN THE GAS-PHASE AND COLD INERT GAS MATRIXES

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Photodissociation (PD) is a natural means for removal of volatile organic materials from atmosphere. We have studied UV-PD reactions (excitation wavelengths = 254 and 266 nm) of various cyclic and acyclic ketones in the gas phase, and studied also how the reaction channels are altered when the molecules are embedded in cold inert gas matrixes. The gas-phase PD products are characterized by quadrupole mass spectrometry followed by low-energy electron-impact ionization and also by gas-phase FTIR spectroscopy of irradiated gases. PD yields are estimated by measuring the depletion of parent molecular ion signal following introduction of UV laser pulses into molecular beam before ionization and comparing the results with respect to a standard. The mechanisms of PD reactions are suggested by identifying the transient intermediates by mass spectrometry, and energy partitioning among the PD products are estimated by analyzing the shapes of the time-of-flight signals.