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### Applications of laser-based ionization mass spectrometer in molecular photodissociation

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By using the time-of-flight mass spectrometer, we have provided insight into interrelation of the ionization and fragmentation mechanism of ketene. When a Resonance-Enhanced Multiphoton Ionization (REMPI) technique is applied via the Rydberg state, the (2+1) REMPI process leads to a direct photoionization of ketene under low ionizing laser energy. When the (2+2) REMPI process dominates, the ketene ion is produced by the rovibrational autoionization of a superexcited state. The second application is to investigate competitive bond dissociation mechanisms for bromoacetyl chloride, 2- and 3-bromopropionyl chlorides following the transition  $1 [n(O) \rightarrow \pi^* (C=O)]$  at 234-235 nm. The branching ratios of C-Br/C-Cl bond fission were evaluated to be 0.47, 0.24 and 0.098, respectively, by using (2+1) REMPI technique equipped with velocity ion imaging. The mechanisms for C-Cl and C-Br bond fission are discussed. We will report photodissociation dynamics of methyl formate  $HCOOCH_3$  at photolysis wavelengths from 225 to 255 nm. Ion imaging of CO and H are acquired. The translational energy distributions of CO comprise three channels of triple fragmentation, roaming and Transition State (TS) processes, as photolysis wavelength is  $>248$  nm.

#### Biography

King-Chuen Lin is a Distinguished Professor of the Department of Chemistry at National Taiwan University and a Distinguished Research Fellow of National Science Council, Taiwan. He has received his BS degree in Chemistry from National Taiwan University, Taiwan, PhD in Chemistry from Michigan State University, USA and Postdoctoral career at Cornell University, USA. His research interests are photodissociation and reaction dynamics in gas and condensed phases, atmospheric chemistry and single molecule spectroscopy. He has published more than 172 related papers.

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