

PHOTODISSOCIATION DYNAMICS OF CORONENE AT 532 NM

DOUGLAS OBER, TYLER M NGUYEN, *Division of Chemistry and Chemical Engineering, California Institute of Technology, Pasadena, CA, USA*; FRANK MAIWALD, ROBERT HODYSS, *Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA*; JESSE LEE BEAUCHAMP, *Division of Chemistry and Chemical Engineering, California Institute of Technology, Pasadena, CA, USA*; DEACON J NEMCHICK, *Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA*; MITCHIO OKUMURA, *Division of Chemistry and Chemical Engineering, California Institute of Technology, Pasadena, CA, USA*.

Polycyclic aromatic hydrocarbons (PAHs) are an important reservoir of carbon in the interstellar medium, and central to proposed formation mechanisms for identified fullerenes. The process of PAH photofragmentation is not fully understood, and depends on molecular identity and light source characteristics. In this work, protonated coronene and per-deuterated coronene were photofragmented in a modified commercial linear ion-trap mass spectrometer via focused continuous-wave 532 nm laser light. The laser power and ion trapping time were scanned to discover trends in the photodissociation process. A sequential photodissociation process was discovered: first the creation of the coronene cation, then hydrogen loss through molecular hydrogen removal, and finally carbon cluster fragmentation producing a series of shrinking carbon cations. The fragment distribution could qualitatively change under constant total photodissociation energy, being second-order with respect to laser power but first-order with respect to irradiation time. Lastly, several unexpected spectroscopic states and potential isomerization were discovered in the photodissociation process.