

Abstract Submitted
for the DAMOP05 Meeting of
The American Physical Society

Electron Impact Dissociation of CH₂⁺ Producing CH⁺ and C⁺ Fragments C.R. VANE, M.E. BANNISTER, Oak Ridge National Laboratory, R.D. THOMAS, Stockholm University — Absolute total cross sections have been separately measured for electron-impact dissociation of CH₂⁺ molecular ions resulting in CH⁺ and C⁺ fragments for 3-100 eV collisions using a crossed electron-ion beams technique. Magnetic analysis was used to selectively separate and detect the product CH⁺ and C⁺ ions, which were generated through a combination of dissociative excitation (DE) and dissociative ionization (DI) channels. DE yields neutral light fragments, while DI yields charged light fragments in addition to the CH⁺ or C⁺. In these measurements coincident light H, H₂ and/or H⁺, H₂⁺ fragments were not detected. The relatively ‘hot’ (internal state) 10 keV CH₂⁺ ions were provided by the ORNL CAPRICE ECR ion source. For both CH⁺ and C⁺ the measured total cross sections above 20 eV are approximately equal and energy independent at $\sim 5 \times 10^{-17}$ cm². The total uncertainties of the present results are about 10% at 40 eV. A broad peaked structure is observed in the CH⁺ cross section rising to $\sim 1 \times 10^{-16}$ cm² at 10 eV. These heavy fragment data are being combined with previous measurements of light fragments from dissociation of CH₂⁺ in an attempt to develop a coherent picture of the total electron-impact dissociation process. Research was sponsored by the OBES and OFES, U.S. DOE, under Contract No. DE-AC05-00OR22725 with UT-Battelle, LLC.

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Date submitted: 01 Feb 2005

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