

4th World Congress on

MASS SPECTROMETRY

June 19-21, 2017 London, UK

Molecular ion collision chemistry in CH₄ ionization and dissociation

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Although the phenomena of atomic collisions have been the subject of extensive research, much more can be learned about these complex and variant processes. Further experimental and theoretical studies of ion-molecule collision will provide a better understanding of the atomic structure, collision phenomena, and molecular ion formation. The use of the 90o hemispheric electrostatic high resolution analyzer [1] in conjunction with time of flight techniques allowed us to identify the various events associated with charged ion- molecular collision. In the present work, we have reported the relative intensities of the dissociative and non-dissociative ionization [2, 3] of CH (n= 1-4) ions produced in a recoil ion source by a pulsed fast 19 MeV F⁴⁺ pump beam. High resolution translation energy spectrum for these ions was produced, at 0.5 mTorr pressure in the recoil ion source. Figure 1 depicts several events involving methane collision which are graphed on a counts versus the time-of-flight. The mass to charge ratio which is proportional to the square of the time-of- flight is also shown.

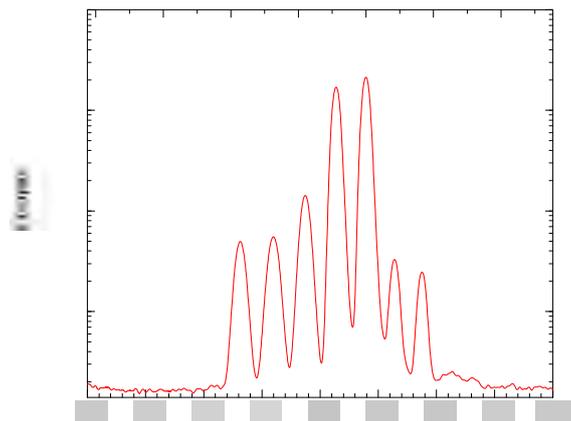


Fig. 1: The time-of-flight spectrum for F⁴⁺ + CH₄ recoil ions.

Biography

Asad Hasan has completed his PhD from the University of Kansas, Lawrence, USA. Heavy-ion interaction of 24Mg + 24Mg at 60 MeV lab energy was conducted utilizing the Argonne National Laboratory facility. His areas of research are: the experimental study of heavy-ion reactions; a study of the formation, equilibration and the de-excitation processes of the compound nucleus formed in fusion-fission collisions, and a study of atomic and molecular interactions; and a study of charge-transfer processes of recoil ions in slow collisions with molecular gases, where single-electron capture processes are the dominant reaction channels. He has published more than 30 papers in reputed journals and serving as an editorial board member of SJPS. At present, he is a professor of physics at the American University of Sharjah, UAE

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