Excitation and fragmentation of C_nN molecules; Fundamental aspects and application to astrochemistry.

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Amongst the ~180 molecules detected in the interstellar medium (ISM), carbon-based molecules are dominant, associating carbon atoms with hydrogen, nitrogen or oxygen ones. C_nN molecules, on the neutral but also on the anionic forms, have been detected in ISM [1] and have also been found in planetary atmospheres such as Titan, the largest satellite of Saturn [2].

In the astrochemistry field, dedicated to the study of the molecular composition and evolution in astrophysical environments, a strong demand emerges for molecular fragmentation data to be included in databases such as the recent KIDA (Kinetic Database for Astrochemistry) [3]. Using the dedicated AGAT setup nearby Tandem-Alto accelerator in Orsay, the AGAT collaboration was able to measure fragmentation branching ratios (BR's) for numerous carbon clusters and hydrocarbon molecules of various sizes and charges [4].

We recently began measurements with C_nN^+ molecules. Apart from fragmentation BR's, collisional cross sections for electronic excitation, ionization and charge transfer in 2.25 a.u C_nN^+ - He collisions have also been measured which are of fundamental interest. I will present first results obtained with the C_nN^+ projectiles for collisional cross sections and associated fragmentation BRs and will compare to data obtained previously with pure carbon clusters.

References

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