

Low temperature ion-molecule reactions with drift tube mass spectrometer

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Gas phase ion-molecule reactions are one of the important synthetic pathways for formation of complex molecules in the space. We have developed a new instrument to measure the mobility of gas phase ions. The drift tube technique is extensively used to investigate not only the transport properties of ions (mobility) but also the ion-molecule and charge transfer reactions in the low collision energy range. The temperature variation is achieved by a cryostat system in which the drift tube is integrated.

El-Shall et al.[1,2] studied about associative charge transfer (ACT) reactions in benzene⁺/propene and benzene⁺/acetylene systems and suggesting that ACT reactions initiates polymerization in cold astrochemical environments.

We have applied the drift tube mass spectrometer to investigation of ACT reactions and ternary molecular reactions. We show the details of the low temperature drift tube and some preliminary experimental results.

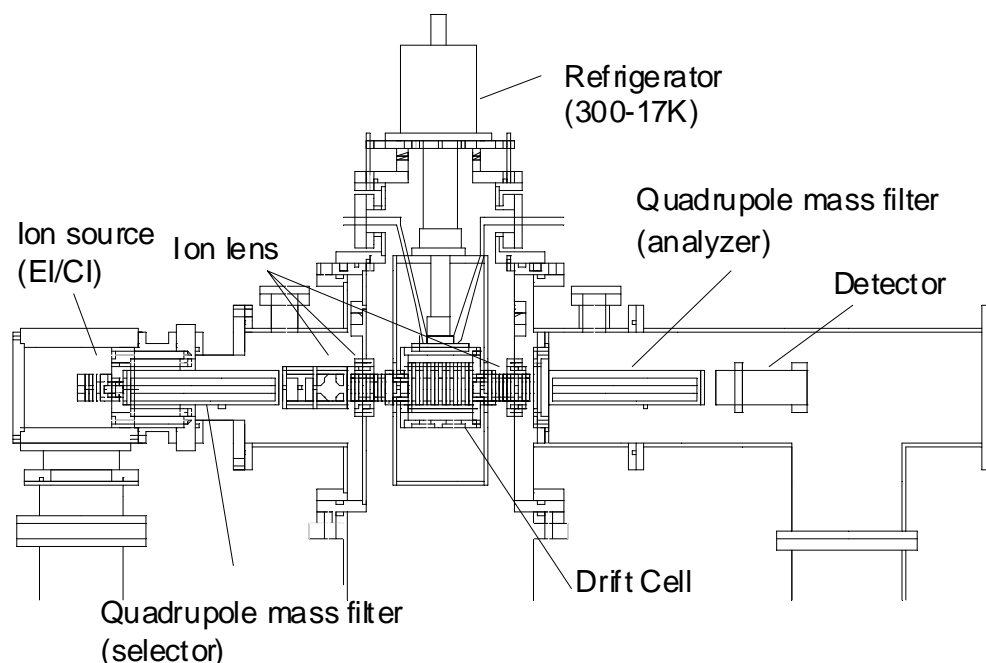


Figure 1: Schematic diagram of the low temperature ion drift tube mass spectrometer.

References

- [1] Y. Ibrahim, M.M. Mautner and M. El-Shall, 2006, *JPCA* 110, 8585.
- [2] P.Momoh, A. Soliman, M.M. Mautner, A. Ricca and M. El-Shall, 2008, *JACS* 130, 12848.