MOLECULAR ION DOPPLER DRIFTS AND ION MOBILITIES IN A GLOW DISCHARGE

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The mobilities of a number of ions (ArD^+, N_2H^+, SD^+ and SD^-) have been studied on the basis of their Doppler shifts in a positive discharge colum. The technique of infrared velocity modulation and precise microwave measurements [a] were employed to investigate the mobilities of spectroscopically identified ions over a broad range of E/N values in an argon buffer gas. For $E/N > 100$ Td, the reduced mobilities exhibit substantial differencies for particular ions which could not be explained using the classical Langevin and kinetic theories. The experimental results and a simple model based on influence of an inhomogenous electric field will be presented.

[a] S. Civiš, A. Walters, M. Yu. Tretyakov, S. Bailleux, and M. Bogey, J. Chem. Phys.108, 8369 (1998).