DIRECT ABSORPTION SPECTROSCOPY OF IONS AND IONIC COMPLEXES IN A SUPERSONIC SLIT NOZZLE PLASMA

HAROLD LINNARTZ, THOMAS SPECK, and JOHN P. MAIER, *Institute for physical chemistry, University of Basel, Klingelbergstrasse 80, CH 4056 Basel, Switzerland.*

Slit jet expansions are routinely used for direct absorption spectroscopic studies of weakly bound neutral complexes. In the last years attempts have been undertaken via plasma formation to extend this method to ionic complexes. A new technique is presented here, based upon the combination of high resolution tunable diode laser spectroscopy and electron impact ionization in a supersonic slit jet expansion.
The characteristics of the novel system are discussed with the example of the infrared gas phase spectrum of N_4^+ [1]. Furthermore, a direct measurement of ionic complexes - Ar-HN_2^+ [2] and Ar-HCO^+ - in the infrared is presented. As most infrared and submillimeter studies are based on direct absorption, this new approach should be generally applicable.

[1] T. Ruchti, T. Speck, J.P. Connelly, E.J. Bieske, H. Linnartz, and J.P. Maier, J. Chem. Phys. 105 (1996) 2591: T. Speck, T. Ruchti, H. Linnartz, and J.P. Maier, J. Molec. Spectrosc. 185 (1997) 425.

[2] T. Speck, H. Linnartz, and J.P. Maier, J. Chem. Phys. 107 (1997) 8706.