Ionization, Excitation and Dissociation at Collisions of e – Ar, O_2 and O^+ – Ar, N_2.

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Two mass- spectrometric devices, with two independent ion sources, are used to perform excitation measurement for O^+ -N_2 collision system. Quadruple filter technique has been used to measure a production of reactant O^+ ion by precisely controlled electron impact ionization and fragmentation cross section of oxygen molecules. Optical spectroscopy device, incorporated with a RF ion source, is used to reveal an exact range of working pressure, in ion source, with respect to control a contamination of primary beam. The fractional percentage of oxygen ions in RF source, being in the ground ^4S and in the metastable ^2D, ^2P states, is estimated. The excitation cross section of molecule N_2^+ ion for (0,0); (0,1) and (1,2) band system in collision of O^+ ion with nitrogen N_2 molecules have been measured. A typical spectrum at fixed energy (E=5 keV) are shown in Fig.1.

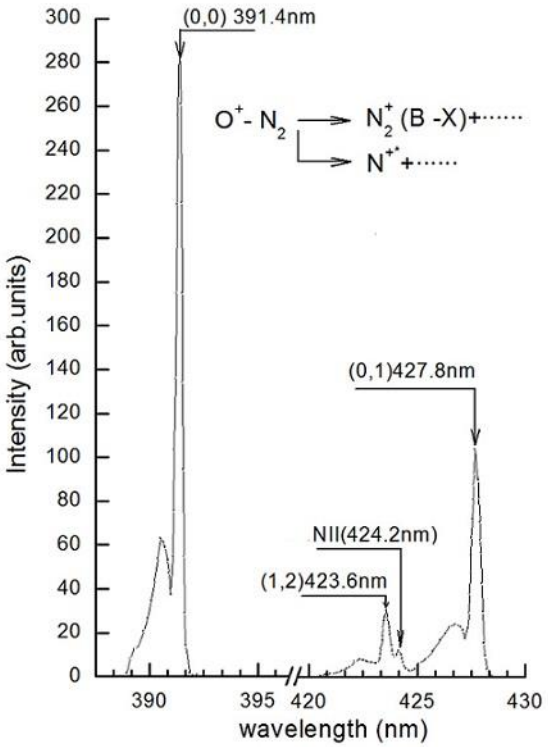

Fig.1. Relative excitation cross section of the (0,0); (0,1) and (1,2) bands of N_2^+ ion and dissociative product of N^+ ionic line in O^+ - N_2 collision at fixed energy (E=5keV) and pressure in ion source (7.10^{-3} Torr). Observed wavelength are as labeled on the figure.