REACTIVE COLLISIONS OF ELECTRONS WITH MOLECULAR CATIONS: EFFECTS AND APPLICATION TO H_2^+, BeD^+

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Dominant elementary processes in numerous cold ionized gases are dissociative recombination (DR), elastic collisions (EC), vibrational excitation (VE) (inelastic collisions), vibrational de-excitation(VdE) (superelastic collisions), and dissociative excitation [1, 2]:

$$AB^+(N^+,v^+)+e^-\rightarrow A+B,AB^+(N^{+'},v^{+'})+e^-,\quad A+B^+(N^{+'},v^{+'})+e^- \qquad (1)$$

where N^+/ v^+ stand for the rotational/vibrational quantum numbers of the cation.

In this work, using a stepwise method based on Multichannel Quantum Defect Theory (MQDT) [3], cross sections and rate coefficients have been obtained for reactions induced on $H_2^+$and BeD^+[4].

The different mechanisms taken into account for H_2^+, i.e. direct vs indirect and rotational vs non-rotational processes are presented in this work.

An analytic three-channel model was developed for the description of simultaneous direct and indirect DR cross sections of H_3^+ [5].

For these analyzed systems the results is in good agreement with the CRYRING (Stockholm) and TSR (Heidelberg) *magnetic* storage ring results.

Keywords: Dissociative recombination, Multichannel Quantum Defect Theory, rate coefficients.

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