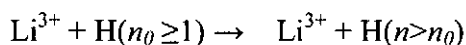


## §5. Cross Section Database for $\text{Li}^{3+}$ Colliding with H Atoms

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Using the available experimental and theoretical data, as well as well established scaling relationships, a cross section database for excitation, ionization and electron capture processes in collisions of  $\text{Li}^{3+}$  ions with hydrogen atoms in their ground and excited states has been generated. The experimental and theoretical data were critically assessed for their accuracy and a "preferred" ("recommended") cross section was derived on that basis for each considered reaction. So derived recommended cross sections were then fitted to appropriate analytic fitting expressions that have correct physical behavior at both low- (or threshold) and high-energy regions. The uncertainties of provided cross sections were estimated for different energy regions.

For the excitation processes



only theoretical data were found in the literature for the transitions  $n_0=1 \rightarrow n=2,3,4$ . The cross sections for other transitions were determined by using scaling procedures.

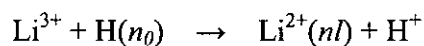
For the ionization processes



a significant number of both experimental and theoretical data are available, but only for the  $n=1s$  ground state of H. The ionization cross sections for the excited hydrogen states were determined by fairly well established scaling

relations.

For the electron capture process



experimental data were found only for the total cross section (summed over  $nl$ ) for capture from the ground  $n_0=1s$  state. Several highly accurate theoretical calculations exist for the state-selective electron capture from  $\text{H}(1s)$  to specific  $nl$  states of  $\text{Li}^{2+}$  ion. Such calculations are, however, very sparse for  $n_0 > 1$  states. While a scaling relation does exist for the total electron capture cross section for  $n_0 > 1$ , for the state-selective  $nl$ - cross sections such relations are not available at present.

A NIFS-DATA report is now being in preparation with the generated database.