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## **[451] Ternary reactions and cluster formation of $\text{Cl}^-$ with $\text{H}_2$**

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Dihydrogen halide clusters are the subject of various theoretical and experimental studies. In their anionic state they are weakly bound complexes and can provide insight into dynamical processes in chemical reactions. Here we report the three-body reaction rate of  $\text{Cl}^-$  with  $\text{H}_2$  forming the  $\text{Cl}^-(\text{H}_2)$  complex, as well as the temperature dependence of this reaction in the range of 10–30 K. Furthermore, we observe the back-reaction with an unexpected density dependence to the third power. Comparisons of the experiment in a 22-pole rod and 16-pole wire radiofrequency ion trap are presented and show that the ions reach lower temperature in the 16-pole trap.

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