

## ELECTRON SCATTERING OF NEGATIVE IONS IN A STORAGE RING

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In this paper we present results from experimental studies of negative ions using the heavy ion storage ring CRYRING at the Manne Siegbahn Laboratory in Stockholm.

Studies interactions between electrons and anions have been carried out by Tisone and Branscomb<sup>1,2</sup>, by Dance, Harrison and Rundel<sup>3</sup> and later by Peart, Walton and Dolder<sup>4</sup>. Later, after the storage ring technology came into operation, a number of studies were performed by Andersen and collaborators<sup>5</sup> using the storage ring ASTRID (Aarhus University – Denmark).

One of the main reason for using a storage ring to study anions is that scattering of electrons from the anions can be studied all the way down to zero energy in the center-of-mass frame.

The anions at CRYRING are produced by a Cesium Sputter Ion Source. After injection and acceleration in the ring, the ion beam is transversally cooled by merging the ion beam with the monoenergetic electron beam. The energy dependence of various collision processes between electrons and anions can then be studied by ramping the electron energy and simultaneously detecting the fragments from the collision process.

We will here show experiments investigating the electron detachment process of different atomic and molecular anions.

In particular a study of the  $C_4^-$  ion will be discussed. In the pure detachment channel we observed a resonance which we attribute to the formation of a short lived doubly charged anion  $C_4^{2-}$  (Fig. 1).

We will also present the newest results from our study of halogen anions where we have measured the single, double and triple detachment of  $Cl^-$ .

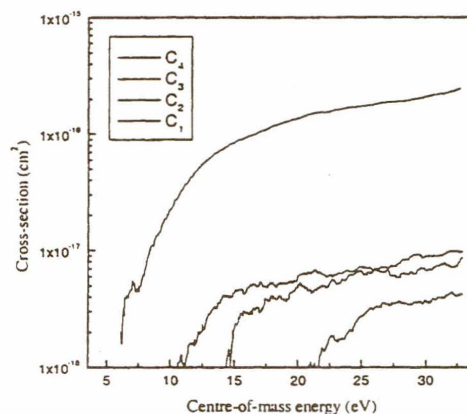


Figure 1. The  $C_4^- + e$  absolute cross section for detachment and four dissociation channels

### References

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