

ABOUT THE DOUBLE IONIZATION OF NH_3 AND CO_2 . A COMPARISON BETWEEN PHOTOIONIZATION AND ELECTRON IMPACT

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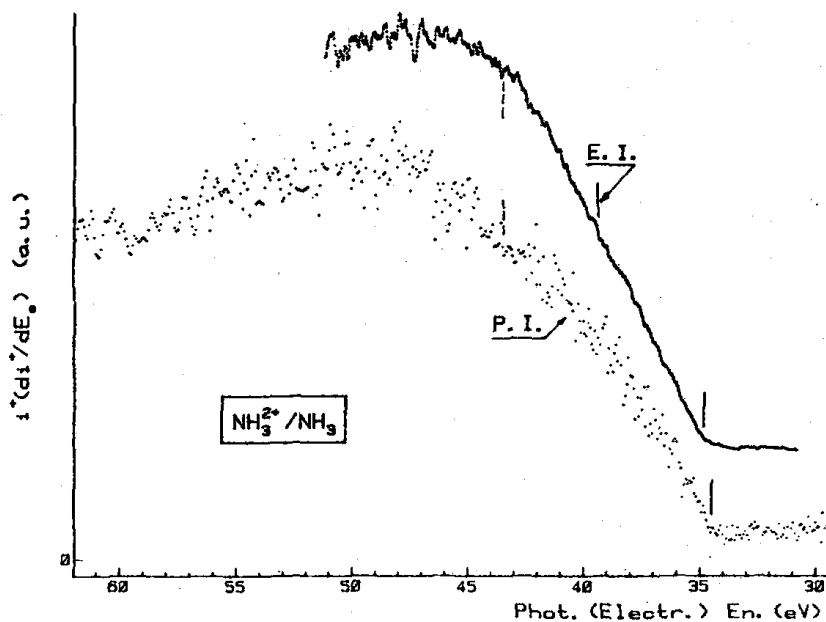
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The double ionization of NH_3 as well as the dissociative ionization of NH_3 into N^{2+} has been investigated by electron impact. More recently Samson et al.² published the photoionization cross-section for NH_3 production down to 34 nm. No double ionization energy was determined.

In the frame of a dissociative electroionization work on CO_2 , still in progress, the double ionization of this molecule has been investigated by electron impact in the 30-100 eV energy range.

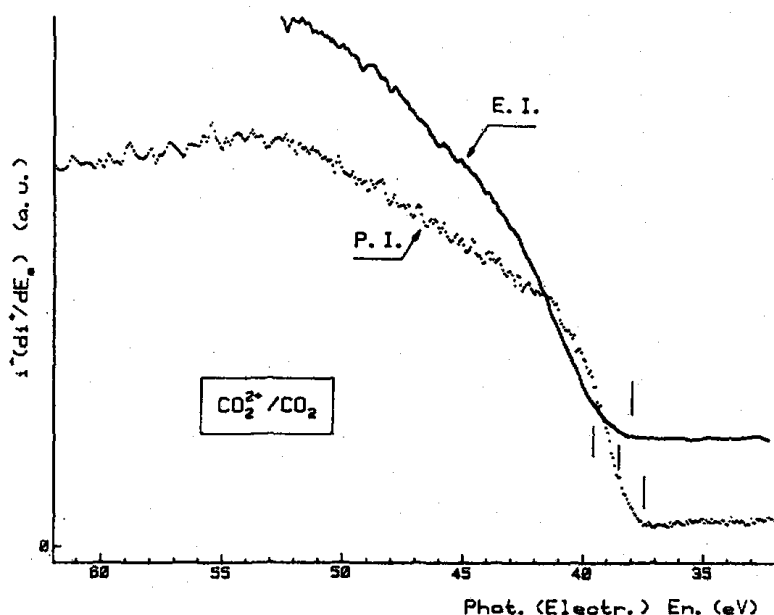
The aim of this contribution is to report on the double photoionization of NH_3 and CO_2 and a comparison will be made with the electron impact results. The synchrotron radiation from the Berlin storage ring BESSY is dispersed by a TGM-monochromator in the wavelength region of 20-45 nm. A quadrupole filter is used for mass analysis.

Fig.1. Electron impact (E.I.) and photoionization (P.I.) efficiency curves of $\text{NH}_3^{2+}/\text{NH}_3$.



Though of very low intensity, the NH_3^{2+} ion current could be recorded with an acceptable signal-to-noise ratio, at least in the threshold region (see fig.1). For comparison the earlier published first differentiated electroionization efficiency curve¹ of NH_3^{2+} is reproduced in the same figure. Good agreement is found between the two experiments concerning the shape of the curves and the threshold energy. The lowest ionization energy is 34.8 ± 0.2 eV by electron impact¹. By photoionization this energy is measured at 34.5 ± 0.1 eV. Both measurements disagree with the electron impact results of Dorman and Morrison, i.e. 33.7 ± 0.2 eV and 36.5 eV.

Fig.2. Electron impact (E.I) and photoionization (P.I.) efficiency curves of $\text{CO}_2^{2+}/\text{CO}_2$



The results of the investigation of CO_2^{2+} by photoionization and electron impact are shown in fig.2. The lowest onset is 37.5 ± 0.1 eV by photoionization. By electron impact this onset is observed at 38.0 ± 0.2 eV. These results disagree with some previous determinations made by photoionization⁴ and electron impact³. Good agreement is found with Auger electron spectroscopy⁵.

References

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