

Elastic electron scattering from formamide

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Synopsis We present an experimental investigation of the elastic electron scattering by formamide. Absolute elastic differential cross sections (DCS) were determined using the relative flow technique (RFT) in the 30–800 eV and 10°–130° angular range. Calculations for the elastic e^- –formamide scattering in the independent atom model (IAM) framework were also performed. Comparison is made between our results and previous experimental and theoretical calculations. This study was mainly motivated by the lack of experimental cross sections available for this molecule.

In this work, an experimental investigation on electron collisions with formamide (NH_2CHO) is reported. This molecule is the simplest system containing the peptide bond. Therefore, the investigation on electron interaction with formamide can be useful to understand processes of electron-protein interactions and modeling of energy deposition upon high-energy irradiation of biomaterials or cell tissues.

The experimental setup and procedure is the same as described in our previous works [1, 2]. The intensities of the elastically scattered electrons were measured using a crossed electron beam-molecular beam geometry. The scattered electrons are energy-filtered by a retarding-field energy analyzer with a resolution of about 1.5 eV resulting in vibrationally-summed cross sections. The angular distributions were converted to absolute DCS using the RFT [3] and argon was used as a secondary standard. We also performed calculations of DCS for elastic e^- –formamide scattering in the IAM framework at the static-exchange-polarization-absorption level of approximation [1].

Fig. 1 shows our DCS for e^- –formamide scattering at 30 and 100 eV in comparison with results available in the literature. There is a good agreement between our experimental data and the calculations reported by Homem *et al.* [2]. Moreover, our IAM calculations at 30 eV disagree qualitatively and quantitatively with both experimental and previous theoretical results. However, the IAM-DCS shows better qualitative agreement with the experimental results at 100 eV, as expected. In Fig 1(b) the experimental DCS of Maljković *et al.* [4] measured in the 35°–110° angular range are also presented. There is a good agreement between both experimental data. Additional results in the 30–800 eV range and discussions will be presented at the work-

shop.

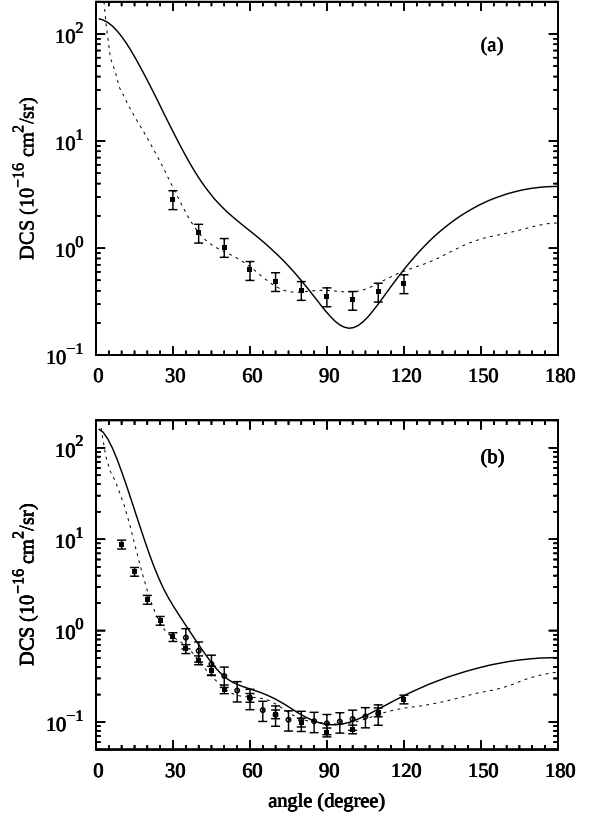


Figure 1. DCS for elastic e^- – NH_2CHO scattering at (a) 30 eV and (b) 100 eV. Solid square, present data; open circles, experimental data of Maljković *et al.* [4]. Dashed line, theoretical results reported by Homem *et al.* [2]; full line, present calculations in the IAM framework.

References

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