

THRESHOLD ELECTRON IMPACT STUDIES OF MOLECULES

H. Silva, E. L. Cordeiro, A. N. de Souza, J. de Oliveira, H. Couto, M. C. A. Lopes

Departamento de Física, Universidade Federal de Juiz de Fora, Brazil

Threshold Electron impact studies, which distinguish and detect electrons scattered by atoms and molecules in the energy range from 0 to 10 meV, are very important, because the selection rules applied to it are much more relaxed compared with those applied to the photoionization process, or even to no-threshold electrons inelastically scattered. Various important process occur in threshold electron impact excitation of atoms and molecules, by instance, electron –electron correlation effects close to ionization potentials, resonance formation, and energy exchange due to post-collision integrations. In the present work we present the preliminary results from a threshold electron impact spectrometer built up in our laboratory. The spectrometer consists essentially of a monochromatized electron gun, an effusive gas source and an electron analyzer, which utilize the penetrating field technique [1] for the efficient collection of threshold (nearly – zero energy) electrons. It can be tuned to accept threshold electrons (< 20 meV) and work with a power resolution of 716, with a high signal/noise ratio. The electron gun operates continually in the energy range 1.5 to 20 eV, producing electron beam with 0.5 mm diameter and current intensity about 10 nA. This apparatus can also be tuned to operate as Electron Energy Loss Spectrometer, fixing its impact energy and scanning the collection energy of analyzer.

References:

1. Cvejanivic, S.; Read, F.H.; *J. Phys. B:At. Mol. Phys.* **1974**, 7, 1180.

Acknowledgments:

This work is funded by CAPES, FAPEMIG and CNPq.