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ELECTRON ENERGY LOSS SPECTRA OF ALANINE

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In order to understand mechanisms of radiation damage in cells, we have been studying processes of elastic electron scattering, exitation and formation of resonances in molecules such as glycine (H_2N-CH_2-COOH) and alanine (CH_2-$CH(NH_2)$-COOH).

We have used an electron spectrometer ESMA [1] to record energy loss spectra. This spectrometer is equipped with the titanium oven heated by coaxial heater and hemispherical energy selectors both in monochromator and analyzer. The electron beam crosses the molecular beam perpendicularly.

Alanine exists under standard condition as a crystalline powder. The crucible of the oven was filled with 99% pure alanine. A sufficient vapour pressure for the formation of a molecular beam can be achieved at temperatures of about 450 K. The molecular beam was formed by effusing the molecules through a capillary into the interaction region. In the gas phase, alanine exists in the neutral tautomeric form only whereas in aqueous solution and in the solid phase the zwitterion is the predominant form of this amino acid [2].

An energy loss spectrum, focused on inelastic states, at 60 eV impact energy and scattering angle 6° is shown in figure 1. The pressure was in the range of 10^{-6} Torr during the experiment.

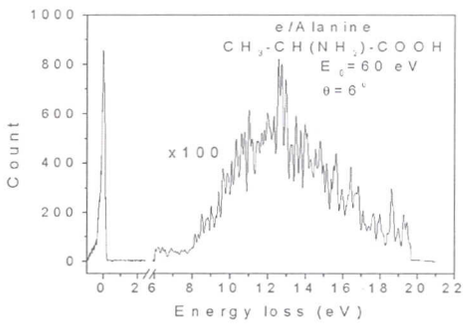

Figure *1. Electron energy loss spectrum of alanine .*

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