

Molecular Spectroscopy

Oliver Hampe
(Physikalische Chemie)

In this lecture we will give an introduction into gas-phase laser spectroscopy on molecular ions. The focus is on photodissociation and photodetachment techniques of trapped ions including vibrational and electronic excitation schemes like infrared multi-photon dissociation.

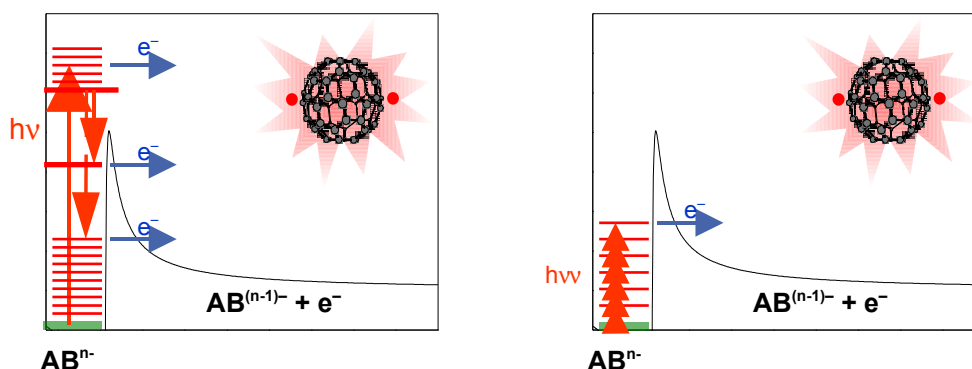


Fig. 1: Single-photon electronic photoexcitation scheme (left) and vibrational multi-photon excitation scheme (right) of a molecular negative ion AB^{n-} leading to electron emission via a direct detachment ("over the barrier") or a tunnelling process.

The aim of the lecture is to provide insight into basic experimental methodologies behind gas-phase studies including molecular beam and ion trap techniques. We will then be using selected research examples of current interest – mainly on multiply negatively charged systems – to highlight the type of physico-chemical information obtained. Finally, the close connection to neighbouring fields (e.g. quantum chemistry) will be established.

Literature:

(1) W. Demtröder "Laserspektroskopie" (5. Auflage, 2007, Springer Verlag)