

PAC Spectroscopy applied to biochemistry

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Due to the complexity of systems in living matter nuclear techniques are not commonly used in biology and biochemistry. The ISOLDE facility is, however, a perfect place for carrying out experiments with Perturbed Angular Correlation of γ -rays (PAC) spectroscopy. This well established technique is suitable for addressing different biological topics, such as metalloprotein structure, dynamics of protein folding or protein-protein interaction, providing information on the molecular and electronic structure at the PAC probe site. By approaching from simple inorganic complexes we aim to elucidate the fundamental chemistry of heavy metal ion interaction with proteins. This involves studies on de novo designed peptides, naturally occurring proteins, plants and recently also bacteria.

In the present work we have selected some of the biological applications that we find particularly interesting. We will show how, with the use of PAC and NMR spectroscopy, we can monitor the time scale of dynamics at the metal ion binding site. Furthermore, we will present data on heavy metal ions binding to proteins and finally, we will illustrate some interesting examples of in vivo studies.

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