

INVESTIGATION OF HYPERFINE INTERACTIONS IN INDIUM (III) COMPLEXING IN AQUEOUS SOLUTION

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Perturbed $\gamma\gamma$ angular correlation (PAC) spectroscopy has been used to study by ^{111}In complexing in aqueous solutions have been pH=4 to pH=14. This chemical environment it is expected the formation of species such as $[\text{In}(\text{H}_2\text{O})_6]^{3+}$ in a very low pH and $[\text{In}(\text{OH})_6]^{3-}$ to very high pH [1]. This work aims to obtain detailed information on the chemical behavior of the probe nucleus ^{111}In as the advancement of studies with biomolecules is intended to know in detail the chemical reactions in biological systems without interference of this nucleus. Samples were made by appropriate addition of NaOH solution and HCl solution. The pH measurements were performed at approximately 25 ° C with accuracy in high precision pH meter 0.01. The radioactive probe ^{111}In - ^{111}Cd was inserted into the samples (10 μL of InCl_3 pH neutron in 100 μL of the solution). Samples were measured at 295 K and 77 K temperature in the standard 6-BaF₂ detectors PAC spectrometer. The interpretation of the results was based on the measurements of dynamic interaction (295 K) characterized by rotational frequency (λ) from which valuable information on species formed in the environment. PAC measurements at 77 K showed interaction frequency (ν_Q), asymmetry parameter (η) and the distribution of the quadrupole frequency (δ). The results at both 77 K and 295 K are varied for different pHs but are not in agreement with the work of Demille[2].

[1] J. Celeda and D.G. Turck, *J. Inorg. Nucl. Chem* **36**, 373 (1974).

[2] G.R Demille, et al., *Chemical Physics Letters* **44**, 164 (1976).