

Isothermal Titration Calorimetry with bioinorganic subjects: from nucleobase interactions to RNA riboswitches

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Isothermal Titration Calorimetry (ITC) measures the heat evolved or absorbed during the interaction between two molecules/atoms, to report the enthalpy (ΔH), entropy (ΔS), stoichiometry of binding (n), and equilibrium association constant (K_A) from a single experiment and without labelling the individual components. ITC is considered one of the most accurate methods to detect equilibrium dissociation constants in the mM to nM range.

ITC has been widely applied, in the bioinorganic field, to the study of interactions between metal ions and molecules (nucleobases, drugs, amino acids...), but also to study interactions between proteins and small molecules or protein to protein interactions. Regarding nucleic acids, it's also possible to find interesting papers about DNA interacting with metal ions, with proteins or with other nucleic acids. Unfortunately, it has not been widely applied to study RNA–ligand interactions.

We will discuss several examples of application of this technique, ending up with the study of the interaction between a RNA riboswitch, the B₁₂-riboswitch from *Klebsiella pneumoniae*, where the interaction between a 243nt long and the coenzyme B₁₂ was studied.