Characterizing organic, supramolecular and inorganic structures by NMR

Summary

The PhD project includes three classes of materials to be studied by NMR: (1) Structure elucidation of new organic synthesis products by 2D NMR spectroscopy; (2) Variable temperature NMR studies of supramolecular systems for reaction and complexation kinetics and NMR experiments for complexation binding strengths and conformations; (3) Studies of inorganic salts and their complexation with chiral and achiral fullerenes to obtain their structures and formation rates. The PhD student will work on all of the above topics.

Research field:	Chemistry and biotechnology
Supervisor:	Jasper Adamson
Availability:	This position is available.
Offered by:	National Institute Of Chemical Physics And Biophysics
Application deadline:	Applications are accepted between November 16, 2020 00:00 and December 16, 2020 23:59 (Europe/Zurich)

Description

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Firstly, the PhD project will include structure elucidation of the as-synthesized macrocycles to provide information to the synthetic chemists in the group on the structures of the macrocycles and we will then include more elaborate NMR characterization of the binding properties of the macrocycles. Complexation strengths of the macrocycles will be investigated with 1H NMR titration experiments to obtain binding affinities with guest molecules and variable temperature 1H and 13C NMR measurements will be undertaken to understand the dynamics of the macrocycles as well as the dynamics of their complexes in solution. Our synthesized organic molecules will be characterized by 2D NMR techniques. Complexes between inorganic salts and chiral and achiral fullerenes will be investigated by solution and solid-state NMR.

Responsibilities and tasks:

- planning
- implementing and analyzing experimental data
- publication writing
- presentations on research outcomes

Qualifications
The applicants should fulfill the following requirements:

- The applicant should hold or be in the process of defending a Master's degree in solution NMR with an understanding of Supramolecular Chemistry.
- The applicant should be fluent in written and spoken English.
- Personal qualities, such as punctuality, conscientiousness and motivation, are essential to embark upon the PhD degree.

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