Technische Universiteit Eindhoven University of Technology

Fundamentals of supramolecular chemistry

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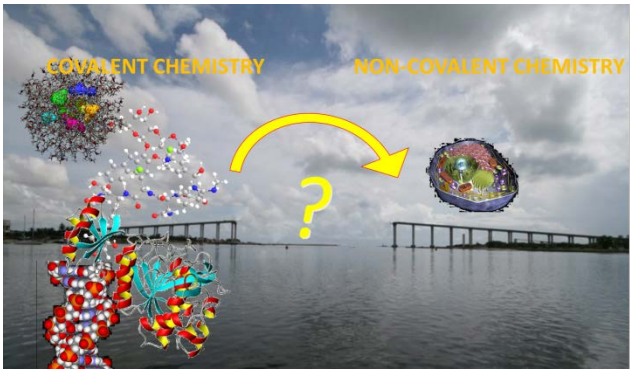
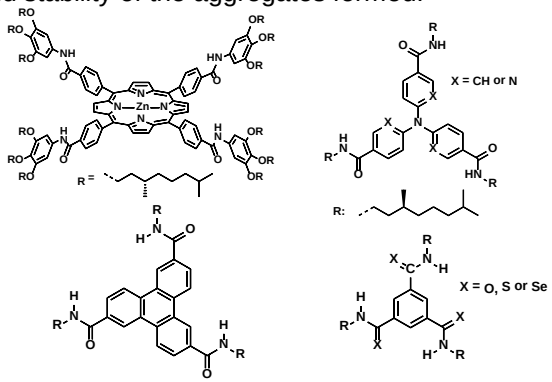
From covalent to non-covalent chemistry

Mastering complexity and multistep non-covalent synthesis are the most challenging research topics in our group. We investigate fundamental issues with respect to self-assembly but we are also studying new aggregation processes to control non-covalent synthesis of molecular systems. Supramolecular protective groups and competition between supramolecular units are just two of the many challenges that we are currently facing on our way to **understanding and mastering the complexity of these processes in order to take non-covalent synthesis to the next level**.



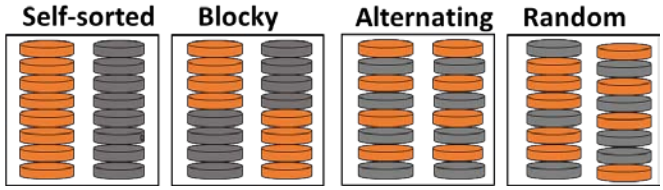
Supramolecular polymerizations

By studying the 1-component polymerisation experimentally as well as theoretically, we have quantified the thermodynamic characteristics of a wide range of SM motifs. An important goal is the ability to *predict* how the molecular structure translates to the nature of the self-assembly process and stability of the aggregates formed.



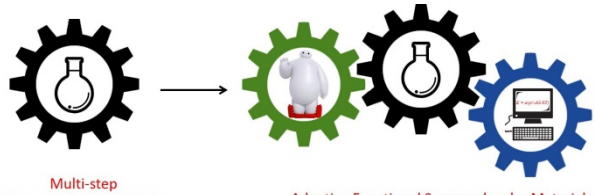
Supramolecular Copolymerisations

A combination of experimental techniques and mathematical models permits to elucidate the thermodynamics and kinetics of polymerisation processes of two (or more) monomers. This permits to tune both the *sequence* and *length* of the copolymers. The properties of the SM polymers can also be altered by using two monomers. Our ambition is to control the microstructure in solution and hereby achieve outstanding properties in the corresponding bulk materials.



Multi-step non-covalent synthesis

Like in covalent synthesis, the outcome of a non-covalent synthesis reaction is determined by the order of events. We currently design multiple component systems, that have multiple different types of interactions to arrive at adaptive functional supramolecular materials.



Masterprojects

We are looking for students that like to combine modelling with experimental approaches and get excited by fundamentally understanding how a collective of molecules behave. Also synthetic chemists intrigued by the plethora of possibilities of new molecular systems are highly welcome. Many projects are available on this subject.

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