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Control of nucleation in supramolecular polymerization

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Stellingen

accompanying the Ph.D. thesis

Control of nucleation in supramolecular polymerization

by

Qin Huang

1. Brownian ratcheting might well be the future of mass transport in the noisy environment of fluids (water, physiological solutions, cellular interior, etc.) to move micro-object with nanoscale precision. (This thesis, Chapter 1)
2. The complex non-covalent interactions between molecules (65 years after the Nobel prize awarded to Donald Cram, Jean-Marie Lehn and Charles Pedersen) are still not easy to predict or fully understand. Even a small change in the length of an apolar group can induce nonlinear effects. (This thesis, Chapter 2)
3. Designing a compound's structure to match the desired target function of a complex behavior remains challenging. Instead of starting with a complicated molecular design, a more sensible strategy is to start with a minimal design that exhibits only one aspect of the behavior desired followed by adding subsequent aspects of behavior by iteration. For each iteration, no matter whether it works or not, we can always adjust strategies based on the result. (This thesis, Chapter 2)
4. The polarity of solvent influences (supramolecular) chemical processes on the thermodynamic as well as kinetic level. Rational engineering of one aspect should consider both stability of the key states that dominate the aspect and the kinetics about these states. (This thesis, Chapter 3)
5. A solvent can have a profound influence on self-assembly in a much more complex way than we currently consider within the field. Molecular simulations that will including more realistic solvent molecules will become more important in the future. (This thesis Chapter 4, Chapter 5)
6. Always prepare a parallel backup research line alongside your main research efforts. It is enriching and it can also save your PhD.
7. Even data from failed experiments can yield important insights.
8. The high impact factor does not always reflect the quality of the research paper.
9. Philosophically, most (scientific) problems are just a lack of quantity.