Self-assembly of flexible and rigid structures: from colloidal molecules to lattices

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Publication List

Work presented in this thesis:

1. **Y. Shelke**, S. Marín-Aguilar, F. Camerin, M. Dijkstra, and D. J. Kraft, "Exploiting anisotropic particle shape to electrostatically assemble colloidal molecules with high yield and purity," *J. Colloid Interface Sci.*, 629, 322–333, 2023. [**Chapter 2**]
2. **Y. Shelke**, F. Camerin, S. Marín-Aguilar, R. W. Verweij, M. Dijkstra, and D. J. Kraft, "Flexible colloidal molecules with directional bonds and controlled flexibility," *ACS Nano*, 17, 13, 12234-12246, 2023. [**Chapter 3**]
3. **Y. Shelke**, D. J. Pearce, and D. J. Kraft, "Self-assembly of flexible colloidal lattices," *In preparation.* [**Chapter 4**]

Other publications:

1. R. W. Verweij, **Y. Shelke**, and D. J. Kraft, "Valence control through linker mobility," *In preparation.*
2. **Y. Shelke**, N. R. Srinivasan, S. P. Thampi, and E. Mani, "Transition from linear to circular motion in active spherical-cap colloids," *Langmuir*, 35, 13, 4718–4725, 2019.
3. **Y. Shelke**, M. Sabapathy, and E. Mani, "Staggered linear assembly of spherical-cap colloids," *Langmuir*, 33, 27, 6760–6768, 2017.
4. M. Sabapathy, **Y. Shelke**, M. G. Basavaraj, and E. Mani, "Synthesis of non-spherical patchy particles at fluid–fluid interfaces via differential deformation and their self-assembly," *Soft Matter*, 12, 5950–5958, 2016.

About the author

I completed my B.Tech in Chemical Technology from Amravati University in 2013. Following this, I pursued an M.S. in Chemical Engineering at the Indian Institute of Technology in Madras, India, which I completed in 2017. Under the guidance of Prof. Ethayaraja Mani, my master's thesis was focused on the self-assembly of spherical-cap colloids. Subsequently, I continued my research as a Senior Research Fellow at IIT Madras, where I worked on a project titled "Self-propelling spherical-cap colloids." In 2019, I began my Ph.D. studies at Leiden University in the Netherlands. Under the guidance of Prof. Daniela J. Kraft, my doctoral research explored the self-assembly of flexible and rigid structures, ranging from colloidal molecules to lattices.

During my academic journey, I have attended several conferences and workshops. Noteworthy presentations of mine include talks on rigid and flexible colloidal molecules at the International Soft Matter Conference and the APS March Meeting, as well as poster presentations at the NWO Physics and Dutch Soft Matter Meeting. I've also enriched my knowledge by attending workshops such as the Han sur Lesse WinterSchool in Belgium and the Frontiers of Nanoscience Winter Retreat in France.

In addition to research, I've taken pleasure in teaching as an assistant for various undergraduate courses at both Leiden University and IIT Madras. I have also had the privilege of co-supervising research projects for both bachelor's and master's students on flexible colloidal structures. In the future, I aim to continue my academic journey and conduct research in a related field.

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