Proceedings of the 8th International Conference on Theoretical and Applied Nanoscience and Nanotechnology (TANN 2024)
Chestnut Conference Centre - University of Toronto, Toronto, Canada – June 10-12, 2024
DOI: 10.11159/tann24.002

Self-Assembly Of Small Molecules in Highly Dilute Environments

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Extended Abstract

Self-assembly of small molecules is a prerequisite for all life as the hierarchical order of structure constructs essential elements of all living organisms. However, what drives these molecules to self-recognize in highly dilute environments and then coordinate their self-assembly remains elusive. To this end, 1,3:2,4-dibenzylidene-D-sorbitol (DBS) is the gold standard for self-assembling low-molecular-weight organogelators (LMOGs), and for the past decade, nuanced molecular changes have been introduced to understand how gelator and solvent structure alter self-recognition and the formation of self-assembled fibrillar networks (SAFiNs) and molecular gels. Coupling solvent parameters with alterations to DBS that included removing conjugation of the benzene groups, removing or acetylating the primary or secondary hydroxy, and replacing the primary hydroxyl group with a halogen provide unique insights into their assembly from their unit cell in the wet gel state to the Hansen space of solvents gelled. The focus is the precipice of solvation and self-recognition.