

KN-11 Crystallization and gelation: orthogonal self-assembly far from equilibrium

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A vast and diverse array of organic compounds and coordination complexes form gels by hierarchical self-assembly either because of hydrophobic effects in water or by more directional interactions such as hydrogen bonding in less polar solvents. Of recent interest is the emergence of metal-, anion and salt-containing gelators based on small-molecule 'low molecular weight gelators (LMWG)'. Particular attractions of LMWGs to the scientific community are the reversible nature of the interactions between the gelator molecules, the wide (essentially unlimited) range of solvents that can be gelled and the possibility of tuning the gels' behaviour by introducing responsive or switching functionality. Gels derived from LMWGs have been proposed in a range of applications and include templation of nanoparticles and nanostructures, drug delivery and as crystal growth media. This presentation focuses on the use of concepts borrowed from anion host-guest chemistry to control and trigger the materials properties of small molecule (supramolecular) gels. We show how concepts firmly rooted in supramolecular host-guest chemistry and supramolecular self-assembly can be married with the materials science of soft matter in order to utilise a molecular-level understanding of supramolecular chemistry to control and manipulate bulk materials properties. This 'evolution' has been described in a recent review,¹ and the application of these kinds of switchable gels as novel media for pharmaceutical crystal growth has recently been described.²

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Figure 1. Carbamazepine crystals growing in a supramolecular gel

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