

Supramolecular Metallogelator: The Pivotal Role of Aromatic Solvents and Anions

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The complex architectures and interesting functional diversities established across multiple biological macromolecules, inspire for exploiting related hierarchical self-assembly to synthesize supramolecular materials with dynamic and tunable properties by balancing weak non-covalent forces. The formation of gels is one of the best examples of such supramolecular self assembly process. These viscoelastic gelatinous materials are of interest for their properties such as porous nature, chemical responsiveness, luminescence, catalytic activity, redox properties and dye sorption and removal from waste waters. Conventionally gels are formed by molecules which have macro structures such as gelatine, agarose, polyacrylamide or silica. In addition to the pure organic gels, the metal and ligand coordination based self-assembly process were also shown to form metal-organic-gels (MOGs) which are quite rigid in nature. The formation of MOGs depends on the nature of the ligand, metal and solvent and their interactions with each other. The diversity of metal–ligand coordination interaction readily and subtly regulates the self-assembly process and microstructures of gels and thereby influence the gel properties. Herein, the complexation/gelation reactions of an unsaturated ketone containing pyridine moieties with metal salts have been studied and found that they form MOGs under certain conditions. All the MOGs, that display the formation of well-developed nanofibrillar networks composed of intertwined fibers, were characterized by using FESEM, TEM, FT-IR spectroscopy and PXRD techniques. Selective dye adsorption and separation were carried out for all the xerogels. These results demonstrate that these multi responsive smart MOGs have the potential to be widely applied in material chemistry.

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