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Porous gel materials assembled from small molecules

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Porous materials have gained considerable interest in fundamental and practical research due to their potential application in gas storage, separation and others. Dynamic covalent or coordination bonds are a class of bonds that can be broken and reformed reversibly under mild reaction conditions. For example, imine bond, formed via the reversible condensation of an amine and an aldehyde, displays ideal dynamic covalent bond characteristics. Using dynamic covalent/coordination chemistry, complex discrete molecular architectures and extended frameworks have been constructed from relatively simple molecular precursors. However, much less is understood about gel porous materials based on dynamic covalent bonding or metal-organic coordination, despite their numerous potential applications as absorbents, sensors, catalytic and responsive materials. Recently we develop this catalogue of gel/aerogel materials that are based on metal-organic coordination [1] or dynamic covalent bonding [2]. Their structure, porosity and formation mechanism have been investigated. The gels show unique hierarchical porosity consisting of interconnected microporous nanoparticles. Their potential applications in sorption, separation, catalysis and others have been demonstrated [3]. The rich diversity of building units makes it possible to develop a wide range of novel functional materials directed by dynamic covalent/coordination bonding.

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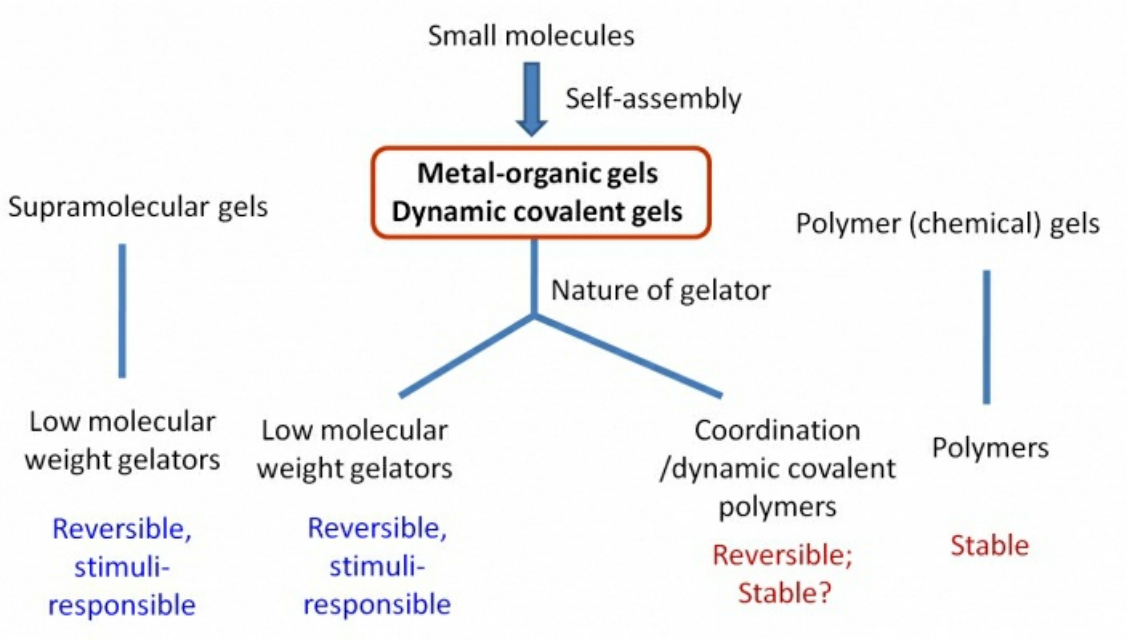

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