2D Polymeric Nanomaterials via MOF-Templated Copolymerization

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In recent years, 2D materials have gained importance due to their unique properties derived from their high degree of anisotropy. However, current synthetic procedures are limited to topochemical polymerizations which reduce the monomer scope and consequent polymer growth.[1] Recently, our group developed a synthetic strategy to access unimolecularly thick polymeric networks using two-dimensional pillared-layer type MOFs as template nanoreactors for the free radical polymerization of vinyl monomers.[2]

In this work, we expand the scope of this novel methodology by using reversible addition-fragmentation chain-transfer (RAFT) polymerization.[3] Two consecutive RAFT polymerizations of different monomers in the presence of crosslinker were carried out in identical MOF particles, which provided block-type 2D copolymer networks (Figure 1).

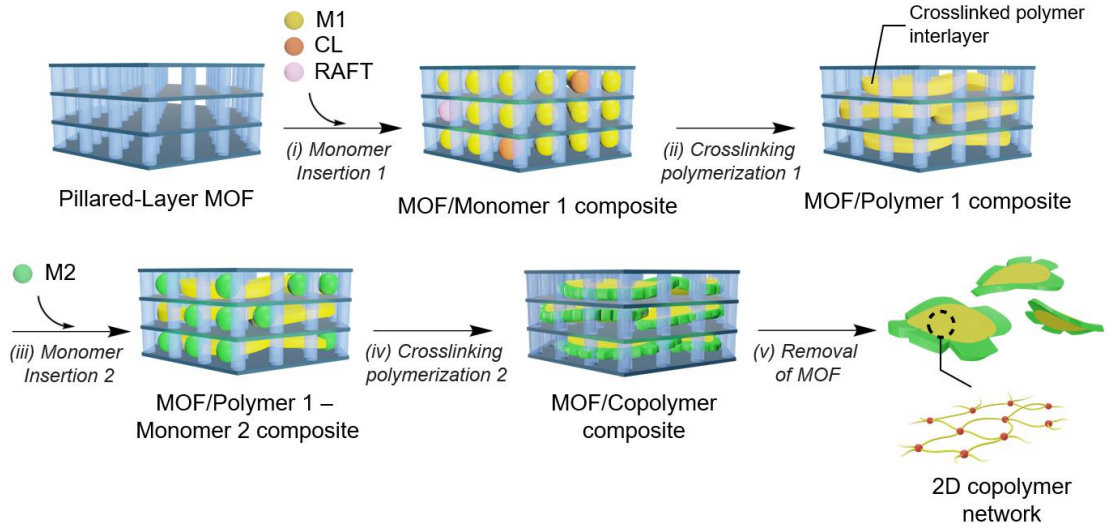

Figure 1. Synthesis of 2D copolymer networks. M1, M2, CL, and RAFT denote the first and second monomers, crosslinker, and raft agent, respectively.

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