Well-defined 2D and 3D Polymer architecture based on tetraborate linkage

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Most crystalline polymer are synthesized through Schiff-base chemistry and boronate ester formation reactions. However, their practical applications have been impeded by the instability linkage, particularly in the case of boroxine or boronate ester-containing frameworks. Here we report the synthesis of 2D tetraborate crystalline polymer and 3D covalent helical polymers, with a high molecular weight. Polymerization and crystallization occurred simultaneously under solvothermal conditions to form single crystals of the resulting helical covalent polymers. Of 3D covalent helical polymer, characterization by single-crystal X-ray diffraction showed that each crystal consisted of pairs of mechanically entwined polymers.

