Title: Highly Crystalline and Enantiopure Chiral Two-Dimensional COFs
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Two-dimensional covalent organic frameworks (2D COFs) are porous polymers formed via the covalent linking of organic monomers in two dimensions, and the subsequent stacking of these layers via non-covalent interactions to create permanently porous, highly crystalline structures. Of increasing interest in recent years is the incorporation of chiral monomers to create chiral frameworks for applications in enantiomer separations, asymmetric catalysis, chiral recognition, and chiral optical activity. However, the asymmetry of chiral monomers can inhibit 2D-network formation and disrupt stacking between layers, reducing overall material crystallinity. Researchers have begun developing various synthetic strategies and monomer functionalities to obtain high-quality chiral COFs (CCOFs), but all CCOF materials reported thus far have been polycrystalline and contain small domains that preclude alignment and many potential applications.

I will present a novel single-crystalline CCOF, **TAPB-(S)-C8-PDA**, which was rationally designed from selecting a chiral aldehyde monomer, **(S)-C8-PDA**, with an extended alkyl chain of eight carbons to facilitate ordered stacking and prevent potential deformation caused by the chiral asymmetry. Combined with a trifunctional amine node **TAPB,** the first reported example of a faceted single-crystal CCOF was obtained, as characterized by its faceted crystal shape in scanning electron microscopy and its sharp powder X-ray diffraction pattern. Characterization of this COFs chiral structure and chiroptical properties will be presented.

