Axially chiral dopants and tropos ligands: Toward functional, chiral periodic mesoporous organosilicas

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Periodic mesoporous organosilicas (PMOs) are a class of highly porous, hybrid organic-inorganic materials prepared by soft-templating methods. The combination of organic groups within the PMO pore walls allows for a high degree of tunability in terms of function, and paired with the robust qualities of the silica framework, these materials are ideal for a variety of applications from heterogeneous catalysis to chromatography. By incorporating privileged organic structures into the PMO, asymmetric catalysis or enantioselective chromatography becomes possible. This work describes highly ordered PMOs incorporating both freely rotating “tropos” monomers and axially chiral dopants within the material framework. The resulting induction of chiral information from the dopant monomers to the PMO bulk phase is highly stable against hydrothermal or chemical racemization.