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Chirality Comes Naturally: a Chiral 3D Nickel Aspartate Framework with Large One-dimensional Channels.

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Chiral microporous materials have become a target of extensive research driven by the increasing demand for materials for enantioselective catalysis and separation. One of the strategies for the preparation of these materials is to use pre-resolved chiral polydentate bridging ligands. We focus on readily available, naturally occurring in a pure enantiomeric form ligands such as amino acids. To achieve larger pores with these relatively small ligands, we use hydrothermal synthesis conditions at the pH range where the transition metal cations form large secondary building units (SBU) by condensation of their coordination polyhedra. An example of such chiral SBU is found in compound I, $[\text{Ni}_2\text{O}(\textit{l}\text{-Asp})(\text{H}_2\text{O})_2]\cdot 4\text{H}_2\text{O}$ ($P2_12_12_1$; *ab initio* structure determination from powder data), which is based on nickel aspartate helices (dia. 11.6 Å) with extended Ni-O-Ni bonding. At higher pH, additional Ni octahedra connect these helices to form compound II, $[\text{Ni}_{2.5}\text{O}(\textit{l}\text{-Asp})(\textit{l}\text{-HAsp})]\cdot 6.5\text{H}_2\text{O}$ ($P4_12_12_2$; structure determination from synchrotron single crystal data). It features a 3D chiral open framework with 5 x 8 Å channels which are among the largest in homochiral crystalline 3D frameworks known to date.