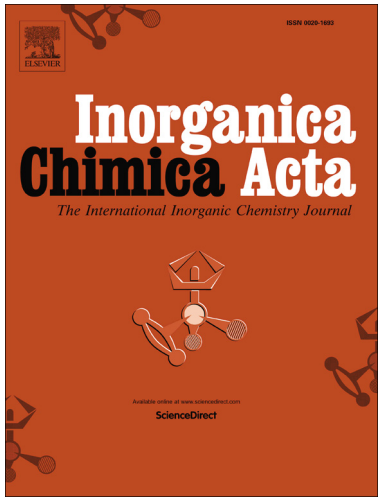

Synthesis, crystal structure, and topological analysis of a La-*p*-bromobenzoic acid-terpyridine 1D-coordination polymer with repeating decameric units and a new 3, 3, 3, 5, 5 pentanodal net topology with a novel point symbol

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Synthesis, crystal structure, and topological analysis of a La-*p*-bromobenzoic acid-terpyridine 1D-coordination polymer with repeating decameric units and a new 3, 3, 3, 5, 5 pentanodal net topology with a novel point symbol

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Abstract

A one-dimensional La^{3+} coordination polymer, $[La_5(C_{15}H_{11}N_3)(C_7H_4O_2Br)_{15}(H_2O)]_2 \bullet H_2O$ (compound **1**), has been hydrothermally synthesized and characterized *via* single crystal and powder X-ray diffraction and crystallizes in the space group $P\bar{1}$. This compound has an asymmetric unit containing five lanthanum (La^{3+}) metal centers and a repeating unit of ten lanthanum centers that form an infinite 1D chain, recognized here as a secondary building unit (SBU), which further assembles into a three dimensional network through halogen-based non-covalent interactions. The local coordination environment and extended supramolecular structure exhibited in this La^{3+} compound is relatively uncommon in rare-earth solid-state chemistry, and a topological analysis reveals a novel 3, 3, 3, 5, 5 pentanodal net with point symbol: $\{3.4.5\}_2\{3.4^2\}_2\{3^2.4^3.5\}_2\{3^2.4^6.5^2\}\{3^2.4\}$. Finally, thermogravimetric analysis on **1** reveals a relatively high thermostability (450°C), with subsequent decomposition to lanthanum oxybromide (LaOBr).

Keywords: coordination polymer; topology; supramolecular interactions; hydrothermal; thermogravimetric analysis