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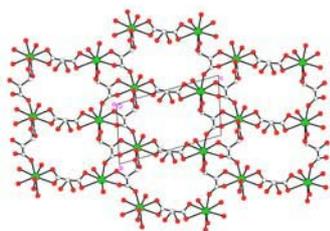
Crystal engineering of chiral porous lanthanide tartrates

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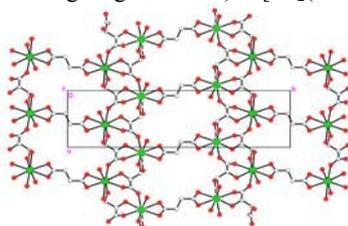
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Keywords: crystal engineering, polymorphic, hydrothermal synthesis, porosity

The hydrothermal stability of L-tartaric acid was established by solution CD spectrometry. Neutral tartrate solutions are stable for several days at temperatures up to 160°C, allowing exploration of hydrothermal coordination chemistry of the ligand. With lanthanide ions the chiral porous phases **1** $[\text{Ln}_2(\text{L-TAR})_3(\text{H}_2\text{O})_2]3\text{H}_2\text{O}$ are formed in good yield and purity for all Ln except Lu, [1]. These compounds are interesting in that two of the three tartrates have similar μ_2, κ^4 binding mode in which the OH groups are chelated, whilst the third tartrate has a simpler μ_2, κ^4 binding involving just carboxylate. We have shown that this can also be replaced by addition of succinate to the reaction, affording **2** $[\text{Ln}_2(\text{L-TAR})_2(\text{SUC})(\text{H}_2\text{O})_2]5.5\text{H}_2\text{O}$. These compounds have modified channel structure and larger cavity size with almost twice as much channel water per formula unit. The open frameworks of **1** retain crystalline structure up to 250°C, although they undergo two phase transitions which involve loss of aqua ligands from the framework, [2]. The first of these steps proceeds with a change of the μ_2, κ^4 ligand, to a more complex binding. The process appears reversible over several months at room temperature.



Packing diagrams for a) **1** $[\text{Ln}_2(\text{L-TAR})_3(\text{H}_2\text{O})_2]3\text{H}_2\text{O}$



b) **2** $[\text{Ln}_2(\text{L-TAR})_2(\text{SUC})(\text{H}_2\text{O})_2]5.5\text{H}_2\text{O}$

[1] S. Thushari, J.A-K. Cha, H. H-Y. Sung, S. S-Y. Chui, I. D. Williams, *Chem. Commun.*, 2005, 5515.

[2] J.A-K. Cha, J. W-H. Kan, S. Thushari, H. H-Y. Sung, I.D. Williams, *Polyhedron*, 2006, in press.