

Two novel luminescent lanthanide sulfate-carboxylates with unusual 2-D bamboo-raft-like structure based on the linkages of left- and right-handed helical tubes involving *in-situ* decarboxylation

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Electronic Supplementary Information:

Table 1. Geometrical Parameters of Hydrogen Bonds for **1**

D-H	d(D-H)	d(H..A)	<DHA	d(D..A)	A
O(1W)-H(11)	0.84	2.06	160	2.865	O(4) [-x, y-1/2, -z+3/2]
O(1W)-H(12)	0.83	1.95	174	2.773	O(2) [-x, -y, -z+1]
N(1)-H(1B)	0.86	2.34	127	2.933	O(4) [x+1, y, z]

Table 2. Geometrical Parameters of Hydrogen Bonds for **2**

D-H	d(D-H)	d(H..A)	<DHA	d(D..A)	A
O(1W)-H(11)	0.85	2.06	160	2.865	O(4) [-x, y-1/2, -z+3/2]
O(1W)-H(12)	0.83	1.97	173	2.795	O(2) [-x, -y, -z+1]
N(1)-H(1B)	0.86	2.32	128	2.921	O(4) [x+1, y, z]

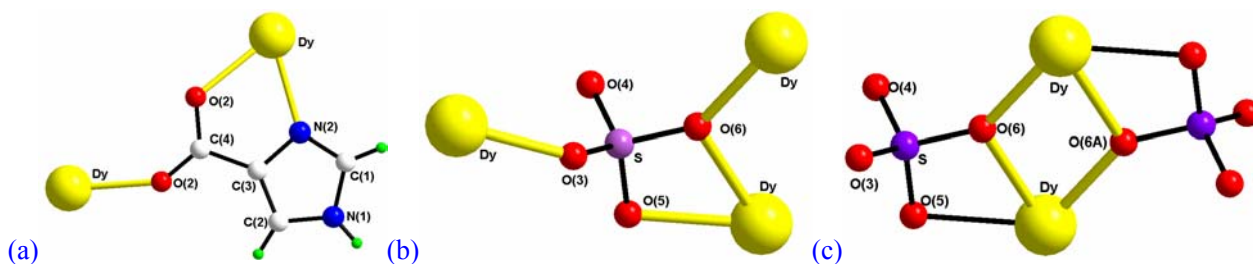


Figure S1. Coordination modes of Hime ligand (a), SO₄²⁻ anion (b) and the dinuclear cluster (Dy₂) units (c). Atoms having “A” in their labels are symmetry-generated. A: -x, -y, -z.

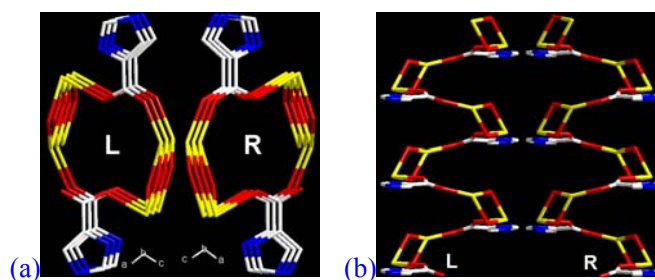


Figure S2. (a) View of the left- and right-handed helical chains down the approximate [010] direction; (b) Side view of the left- and right-handed helical chains along the *b* axis.

In the structure, the [Dy₂O₂] rhombic dimeric cluster units are linked by the carboxyl groups of O(1)C(4)O(2) through two repeated -[Dy₂O₂]-O(1)-C(4)-O(2)- linkages to give rise to left- and right-handed helical channels.

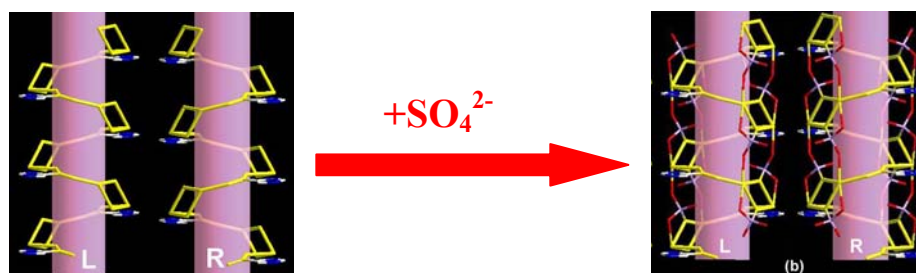


Figure S3. Side view of the helical tubes constructed from the helical chains and SO_4^{2-} anions. The helical chain of $-\{[\text{Dy}_2\text{O}_2]\text{-O(1)-C(4)-O(2)}\}_n-$ is marked yellow for identification.

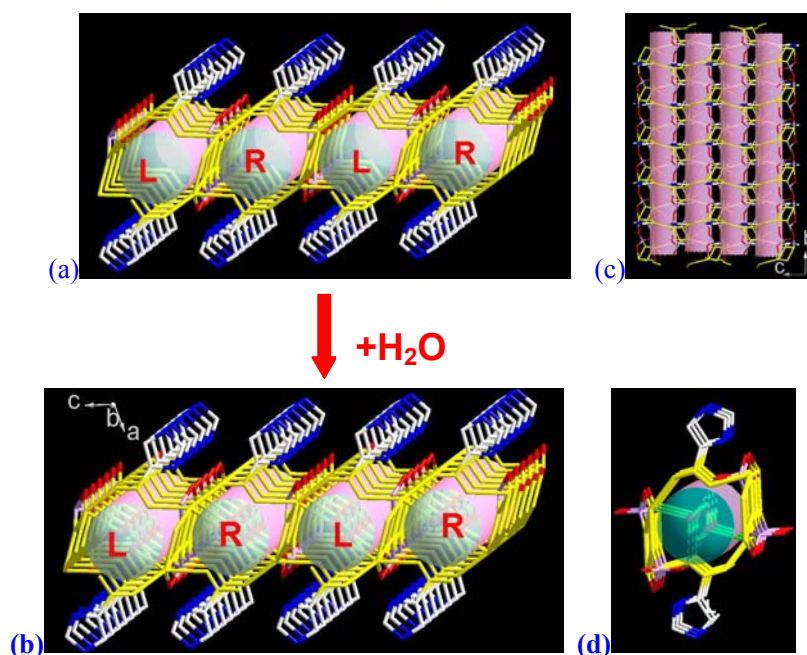


Figure S4. View of 2-D bamboo-raft-like structure formed by the alternating assembly of the helical tubes with opposite chirality. (a) The coordinated water molecules are omitted for clarity; (b)/(c) The coordinated water molecules are shown in the helical tubes; (d) In the helical tubes, the H-bonding network between the coordination water molecules and oxygen atoms of SO_4^{2-} anions.

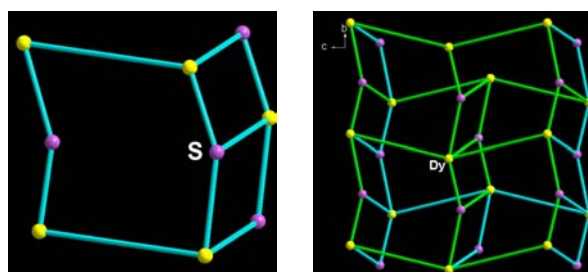


Figure S5. (left) Circuits through SO_4^{2-} in complex **1**. (right) Circuits through Dy in complex **1**. The shortest circuits are differentiated by color. The Dy atoms are denoted by yellow globes, and the purple globes denote the SO_4^{2-} units.

The SO_4^{2-} anion can be considered as a 3-connected node. The shortest circuits at three angles of the 3-connected net are two 4-circuits and one 6-circuit. Thus, the SO_4^{2-} anion has schläfli symbol $4^2\cdot6$. The Dy atom acts as a 5-connected node. The shortest circuits at ten angles of the 5-connected net are two 4-circuits, seven 6-circuits and one eight-circuit. Thus, the Dy atom has schläfli symbol $4^2\cdot6^7\cdot8$.