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Supporting information for article:

Lanthanide coordination polymers based on designed bifunctional 2-(2,2':6',2"-terpyridin-4'-yl)benzenesulfonate ligand: syntheses, structural diversity and highly tunable emission

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Table S1 Continuous Shape Measures (CShMs) of the coordination geometry for Eu³⁺ ions in **1-Eu**.

Label	Symmetry	Shape	1-Eu
EP-9	D _{9h}	Enneagon	33.439
OPY-9	C _{8v}	Octagonal pyramid	22.561
HBPY-9	D _{7h}	Heptagonal bipyramid	15.666
JTC-9	C _{3v}	Johnson triangular cupola J3	15.263
JCCU-9	C _{4v}	Capped cube J8	10.053
CCU-9	C _{4v}	Spherical-relaxed capped cube	9.010
JCSAPR-9	C _{4v}	Capped square antiprism J10	2.787
CSAPR-9	C _{4v}	Spherical capped square antiprism	1.930
JTCTPR-9	D _{3h}	Tricapped trigonal prism J51	3.621
TCTPR-9	D _{3h}	Spherical tricapped trigonal prism	2.612
JTDIC-9	C _{3v}	Tridiminished icosahedron J63	12.541
HH-9	C _{2v}	Hula-hoop	9.076
MFF-9	C_s	Muffin	1.659

Table S2 Continuous Shape Measures (CShMs) of the coordination geometry for Ln^{3+} ions in **2-Er**, **4-Tb**, and **6-Eu**.

Label	Symmetry	Shape	2-Er		4-Tb	6-Eu
			Er1	Er2		
OP-8	D_{8h}	Octagon	31.606	31.785	32.793	31.386
HPY-8	C_{7v}	Heptagonal pyramid	23.708	24.442	23.407	23.932
HBPY-8	D_{6h}	Hexagonal bipyramid	17.013	13.083	12.757	15.881
CU-8	O_h	Cube	11.278	11.664	8.749	11.848
SAPR-8	D_{4d}	Square antiprism	2.952	4.061	2.515	3.074
TDD-8	D_{2d}	Triangular dodecahedron	1.175	2.354	2.854	1.377
JGBF-8	D_{2d}	Johnson gyrobifastigium J26	12.888	10.311	12.298	12.257
JETBPY-8	D_{3h}	Johnson elongated triangular bipyramid J14	28.860	27.436	26.190	27.802
JBTPR-8	C_{2v}	Biaugmented trigonal prism J50	2.932	3.696	3.487	2.568
BTPR-8	C_{2v}	Biaugmented trigonal prism	2.695	3.075	3.040	2.065
JSD-8	D_{2d}	Snub diphenoid J84	3.040	3.315	4.322	3.036
TT-8	T_d	Triakis tetrahedron	11.719	12.434	9.550	12.301
ETBPY-8	D_{3h}	Triakis tetrahedron	22.368	23.087	22.331	23.031

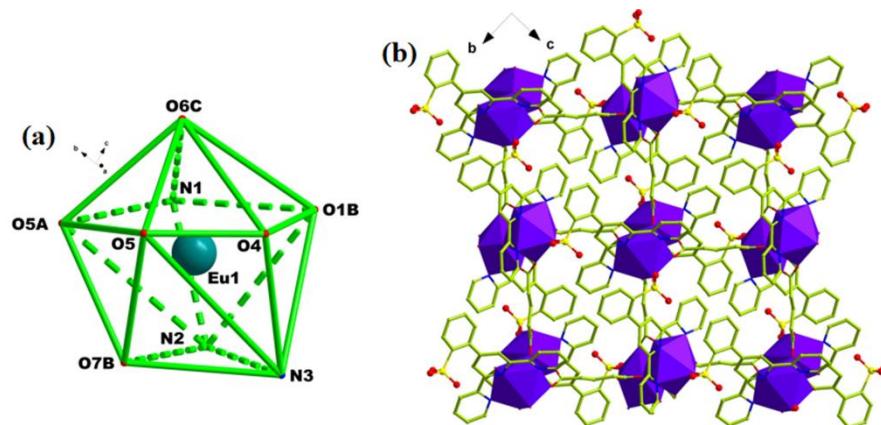
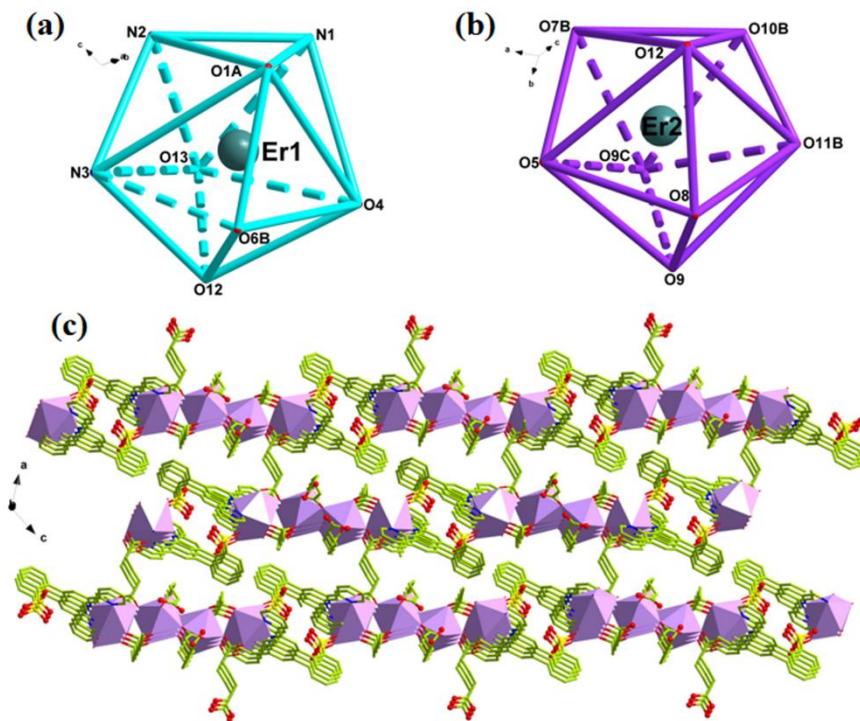
Figure S1 (a) The distorted muffin geometry of Eu³⁺ of **1**. (b) The 2D layer structure of **1**.**Figure S2** (a) Triangular dodecahedral coordination geometry of Er2 in **2**. (b) Triangular dodecahedral geometry of Er1 in **2**. (c) View of the 3D framework of **2**.

Figure S3 (a) Distorted square antiprism geometry of Tb1 in **4**. (b) The 3D network of **4**.

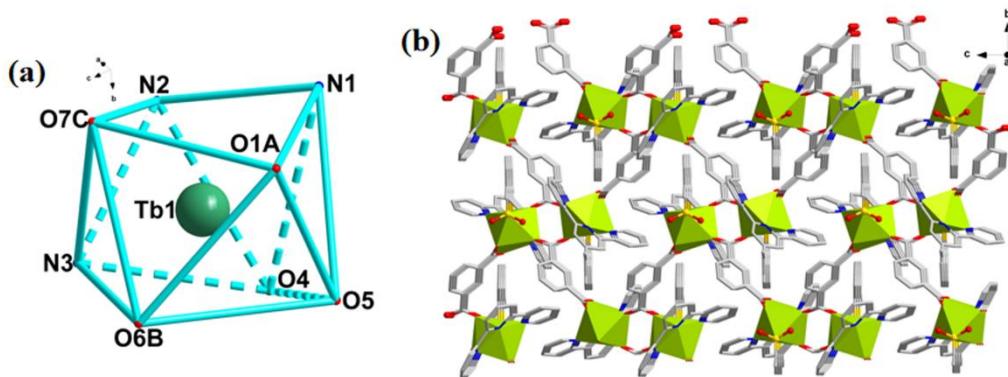


Figure S4 (a) The coordination geometry of Eu1. (b) The 3D network of **6**.

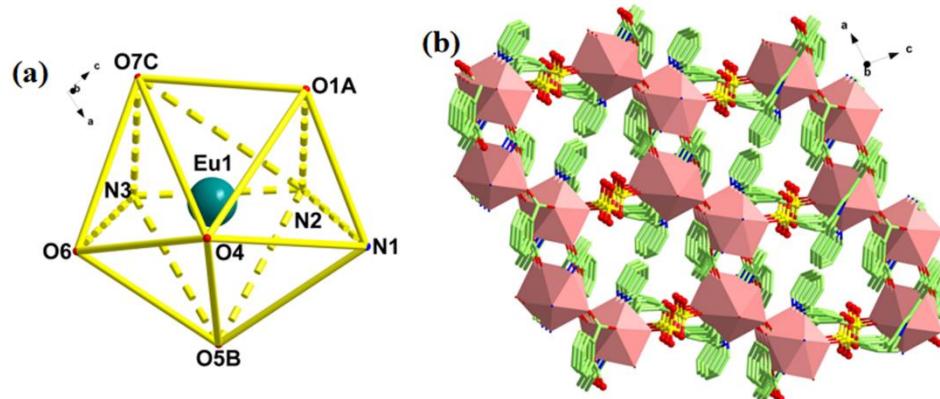


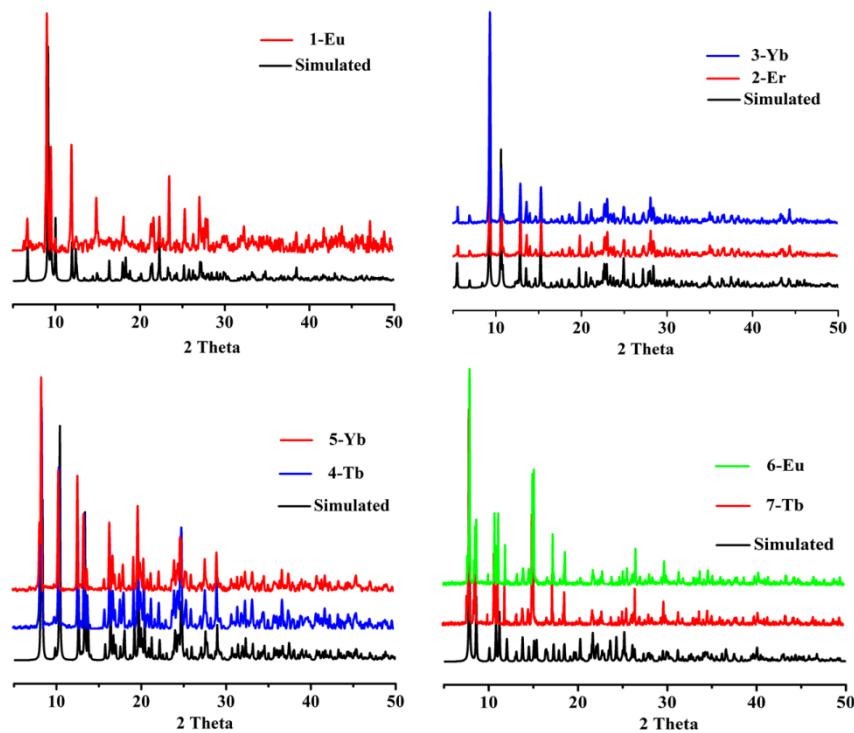
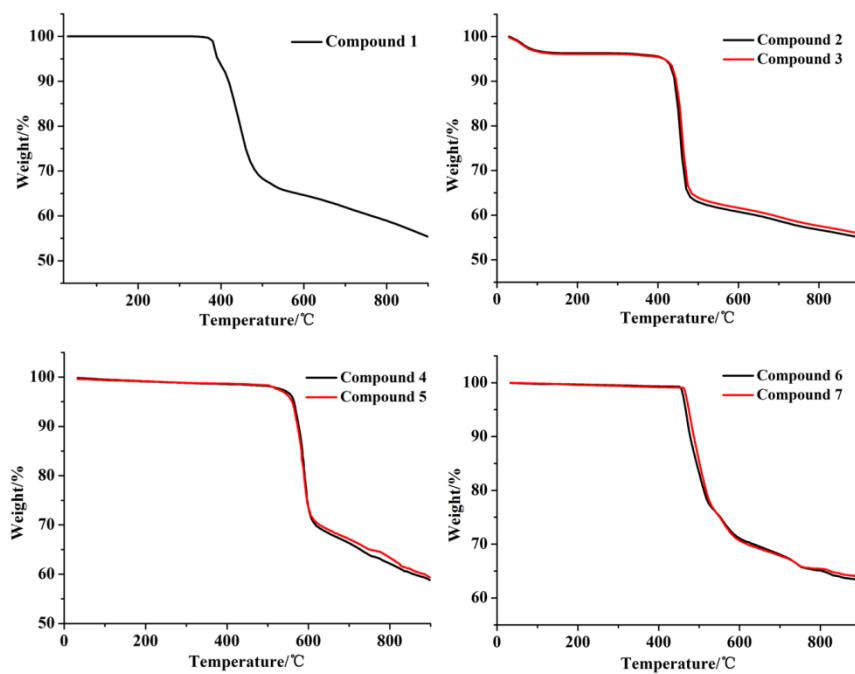
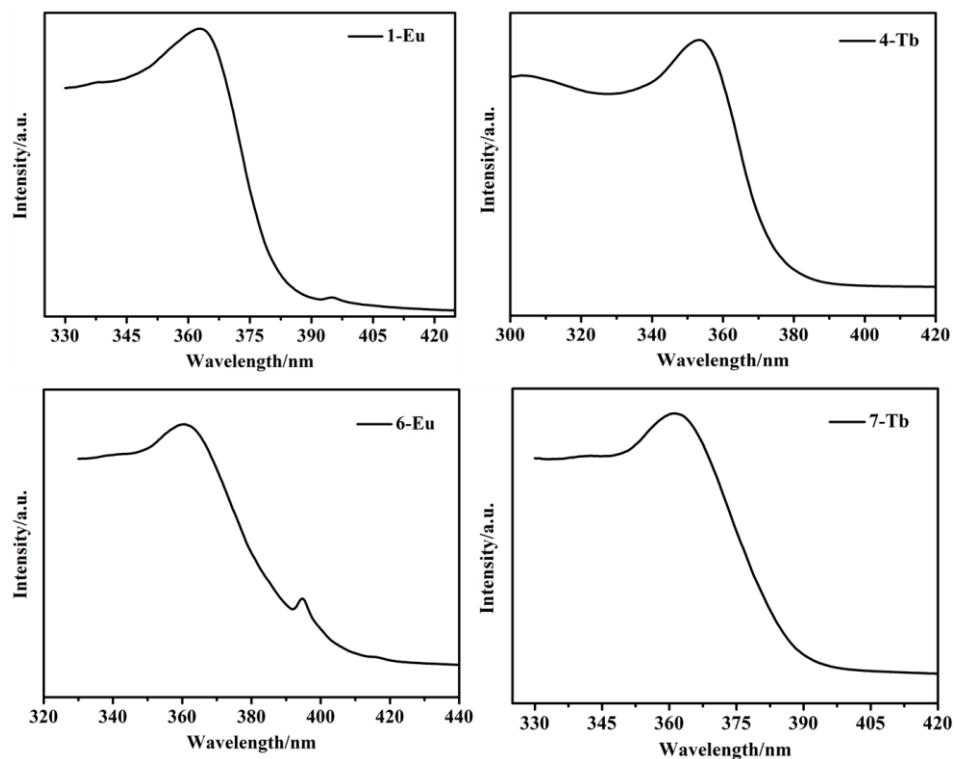
Figure S5 The PXRD patterns for compounds **1-7**.**Figure S6** The TGA curves of compounds **1-7**.

Figure S7 Excitation spectra of compounds **1-Eu**, **4-Tb**, **6-Eu** and **7-Tb**.**Figure S8** The excitation (a) and emission spectra (b) of NaSTP.