Supporting Information
to the paper entitled

Efficient, stable, tunable, and easy to synthesize, handle and recycle luminescent materials: $[H_2NMe_2]_3[Ln(III)(2,6\text{-dipicolinolate})_3]$ (Ln = Eu, Tb, or its solid solutions)

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Table S1 Crystal data and structure refinement data for $[H_2N(CH_3)_2]_3[Eu(2,6\text{-dpa})_3]$ ($\mathbf{1^{Eu}}$) and $[H_2N(CH_3)_2]_3[Tb(2,6\text{-dpa})_3]\bullet 2H_2O$ ($\mathbf{2^{Tb}}$).

Compound	$\mathbf{1^{Eu}}$	$\mathbf{2^{Tb}}$
Empirical formulae	$C_{21}H_9EuN_3O_{12}$, $3(C_2H_8N)$	$C_{21}H_9TbN_3O_{12}$, $3(C_2H_8N)$, $2H_2O$
Formula weight	785.55	828.54
Temperature (K)	293(2)	293(2)
Wavelength (Å)	0.71073	0.71073
Crystal system	triclinic	orthorhombic
Space group	*P*-1	$Pc2_1n$
Unit cell dimensions		
a (Å)	12.0026(2)	10.6792(10)
b (Å)	12.0692(2)	17.0739(3)
c (Å)	12.4073(2)	18.7096(3)
α (°)	78.6380(7)	90
β (°)	69.8886(7)	90
γ (°)	72.6756(8)	90
Volume (Å^3)	1602.19(5)	3411.43
Z	2	4
Calculated density (Mg/m^3)	1.628	1.613
Absorption coefficient (mm^{-1})	2.027	2.146
F(000)	792	1672
Crystal size (mm)	0.06 x 0.08 x 0.15	0.3 x 0.1 x 0.1
Theta range for data collection (°)	3.4 – 27.0	2.18 – 27.48
Index ranges	-13<=h<=15, -15<=k<=15, -15<=l<=15	-13<=h<=13, -22<=k<=22, -24<=l<=24
Reflections collected	11707	63289
Independent reflections	6922	4033
Refinement method	Full-matrix least-squares on F^2	Full-matrix least-squares on *F*
Data / restraints / parameters	3899 / 0 / 433	3899 / 7 / 433
wR (F^2)	0.0286	0.024
Goodness-of-fit on F^2	1.090	1.114
Largest diff. peak and hole (e.Å^{-3})	0.96 and -0.67	1.044 and -2.211

Table S2 Selected bond distances (in Å) for $[H_2N(CH_3)_2]_3[Eu(2,6\text{-dpa})_3]$ (**1**^{Eu}) and $[H_2N(CH_3)_2]_3[Tb(2,6\text{-dpa})_3]\bullet 2H_2O$ (**2**^{Tb}).

$[Eu(2,6\text{-dpa})_3]$ (**1**^{Eu})		$[Tb(2,6\text{-dpa})_3]$ (**2**^{Tb})	
Coordination sphere			
Eu(1) – O(1)	2.409(2)	Tb(1) – O(2)	2.440(5)
Eu(1) – O(2)	2.477(2)	Tb (1) – O(4)	2.419(10)
Eu(1) – O(5)	2.446(2)	Tb (1) – O(8)	2.450(4)
Eu(1) – O(6)	2.427(2)	Tb (1) – O(11)	2.440(5)
Eu(1) – O(9)	2.455(2)	Tb (1) – O(16)	2.440(5)
Eu(1) – O(10)	2.466(2)	Tb (1) – O(24)	2.441(10)
Eu(1) – N(1)	2.553(2)	Tb (1) – N(3)	2.480(6)
Eu(1) – N(2)	2.521(3)	Tb (1) – N(5)	2.540(6)
Eu(1) – N(3)	2.560(2)	Tb (1) – N(28)	2.513(6)
C-O(Eu/Tb)			
C(1) – O(1)	1.260(4)	C(23) – O(2)	1.297(13)
C(7) – O(2)	1.262(4)	C(10) – O(4)	1.250(6)
C(8) – O(5)	1.250(4)	C(18) – O(8)	1.232(12)
C(14) – O(6)	1.259(5)	C(12) – O(11)	1.280(6)
C(15) – O(9)	1.260(4)	C(21) – O(16)	1.250(6)
C(21) – O(10)	1.259(4)	C(32) – O(24)	1.310(6)
C-O			
C(1) – O(3)	1.237(4)	C(23) – O(15)	1.230(4)
C(7) – O(4)	1.245(4)	C(10) – O(26)	1.226(16)
C(8) – O(7)	1.257(4)	C(18) – O(17)	1.240(3)
C(14) – O(8)	1.245(5)	C(12) – O(36)	1.220(5)
C(15) – O(11)	1.244(5)	C(21) – O(34)	1.250(5)
C(21) – O(12)	1.247(4)	C(32) – O(29)	1.228(14)

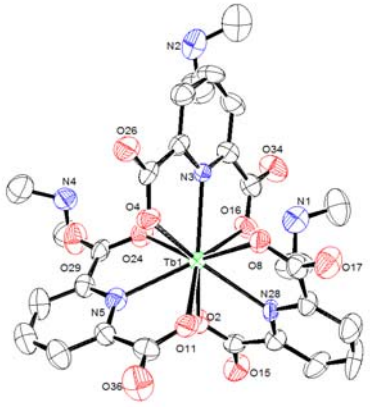

Fig. S1 Perspective view of $[H_2N(CH_3)_2]_3[Tb(2,6\text{-dpa})_3]\bullet 2H_2O$ (**2**^{Tb}). Carbon = white, Oxygen = red, Nitrogen = blue, Europium = green. Hydrogen atoms are omitted for clarity, and ellipsoids are represented at the 50% probability level. **Note:** One water molecule (O2w) resides unbound within the crystal lattice. The other water molecule (O3w) is bridging two complexes via hydrogen bonding with two COO moieties (O3w – O17 = 2.917 Å; O3w – O24 = 2.984 Å). O3w also hydrogen bonded to a $H_2N(CH_3)_2$ cation (O3w – H4a = 2.373 Å; N4 – H4a = 0.969 Å).

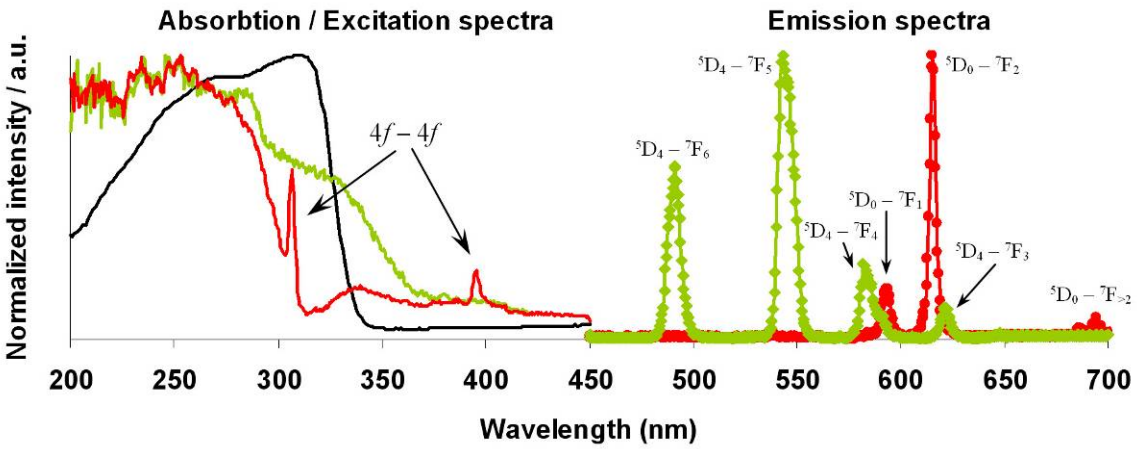

Fig. S2 Left: Absorption spectrum of the ligand **2,6-H_2dpa** (black line) and excitation spectra of $\mathbf{1}^{\mathbf{Eu}}$ ($[H_2N(CH_3)_2]_3[Eu(\mathbf{2,6\text{-}dpa})_3]$, red line, recorded at 615 nm), and $\mathbf{2}^{\mathbf{Tb}}$ ($[H_2N(CH_3)_2]_3[Tb(\mathbf{2,6\text{-}dpa})_3]$, green line, recorded at 545 nm). Right: emission spectra of $\mathbf{1}^{\mathbf{Eu}}$ (red dots, excited at 254 nm), and $\mathbf{2}^{\mathbf{Tb}}$ (green rhomboids, excited at 254 nm). The transitions between two specific energy levels are specified in the figure.

Fig. S3 Artistic impression of complex $\mathbf{1}^{\mathbf{Eu}}$ (left), accompanied by early Christmas greetings painted with the compounds $\mathbf{1}^{\mathbf{Eu}}$ –$\mathbf{3}^{\mathbf{Eu/Tb}}$ and visualized by excitation at 254 nm (right).