*Electronic supplementary information*

# A new family of dinuclear lanthanide complexes constructed from 8-hydroxyquinoline Schiff base and β-diketone: Magnetic properties and near-infrared luminescence

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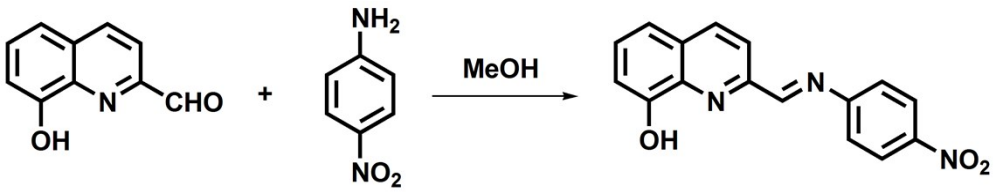


**Scheme S1** The synthesis route of the ligand HL.

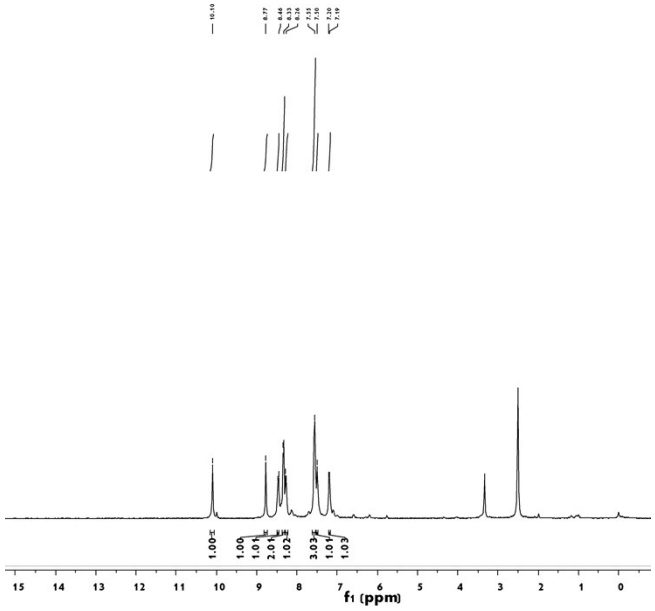


**Fig. S1** $^1$H NMR spectrum (400 MHz, $d_6$-DMSO) of HL.

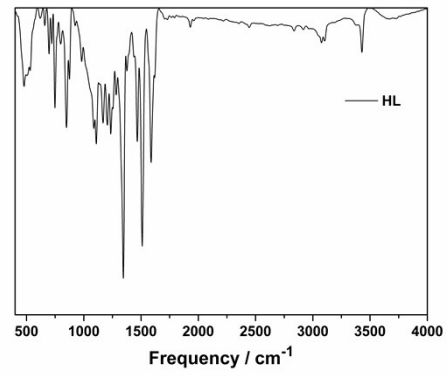


**Fig. S2** IR spectra of a crystalline sample of HL.

**Table S1** The important bond lengths (Å) and angles (°) of complexes **1**-**6**.

| Complexes | The range of Ln-O bond lengths / Å | The range of Ln-N bond lengths / Å | The distance of Ln···Ln / Å | The range of Ln-O-Ln bond angles / ° |
|---|---|---|---|---|
| **1** | 2.367(2) - 2.453(2) | 2.584(3) - 2.739(3) | 3.979(5) - 3.991(2) | 109.16(8) – 109.59(9) |
| **2** | 2.333(4) – 2.433(1) | 2.519(5) - 2.689(1) | 3.899(4) | 108.51(5) |
| **3** | 2.325(2) – 2.429(8) | 2.501(2) - 2.679(2) | 3.889(8) | 108.96(7) |
| **4** | 2.312(01) – 2.414(5) | 2.491(1) -2.671(8) | 3.863(3) | 108.85(6) |
| **5** | 2.300(2) – 2.408(2) | 2.480(2) -2.670(3) | 3.863(8) | 109.08(8) |
| **6** | 2.274(2) – 2.380(2) | 2.453(2) - 2.649(3) | 3.823(3) | 109.41(7) |

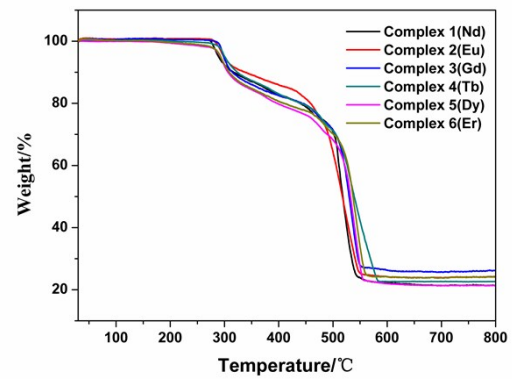


**Fig. S3** TGA curves of complexes **1-6** on crystalline sample under the air atmosphere in the temperature range of 30-800 °C.

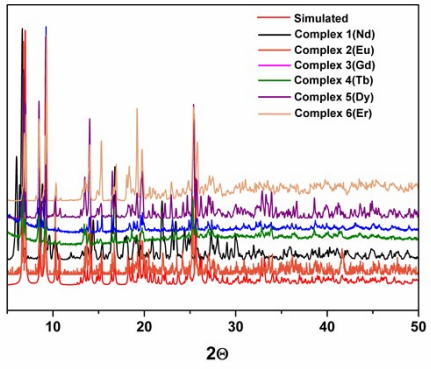


**Fig. S4** PXRD patterns for **1-6**.

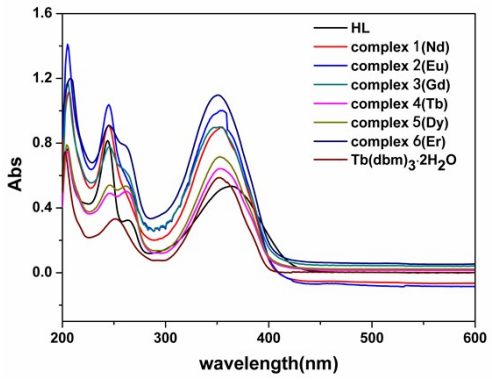


**Fig. S5** UV-Vis absorption spectra of complexes **1-6** in methanol solution at room temperature.

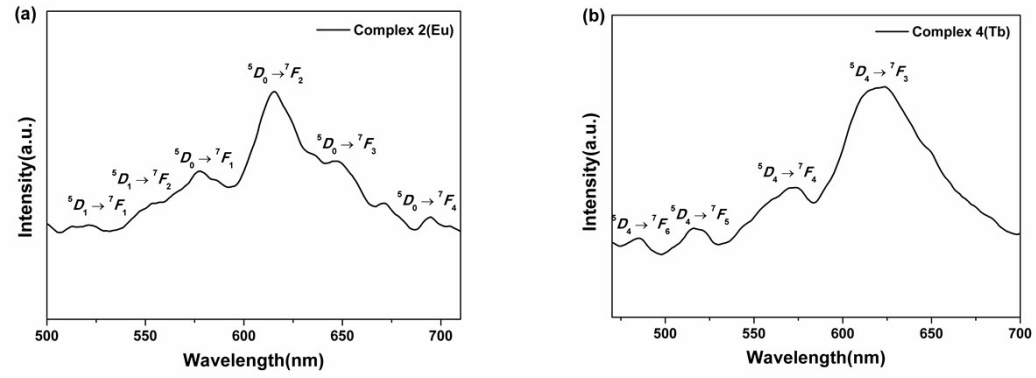


**Fig. S6** The luminescence spectra of complex **2** (a) and **4** (b) in methanol solution at room temperature.

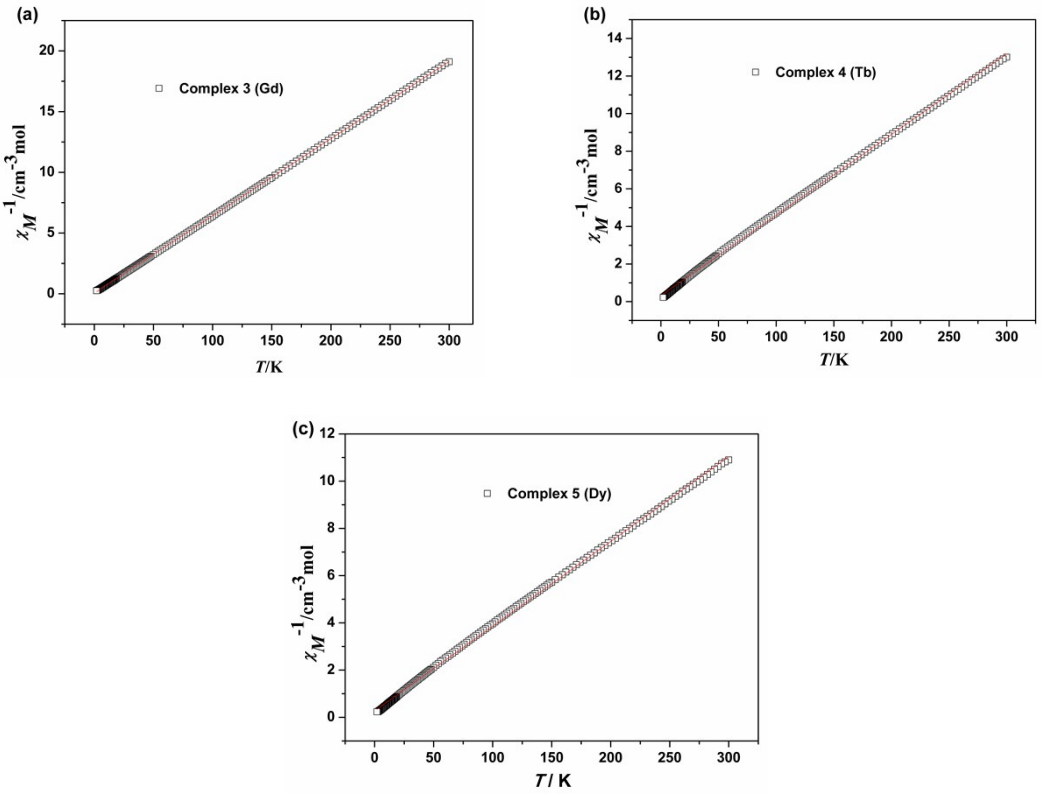


**Fig. S7** Plots of $\chi_M^{-1}$ *vs T* at 2-300 K with a *dc* magnetic field of 1000 Oe for complexes **3** (a), **4** (b) and **5** (**c**). The solid lines were generated from the best fits by the Curie-Weiss expression.

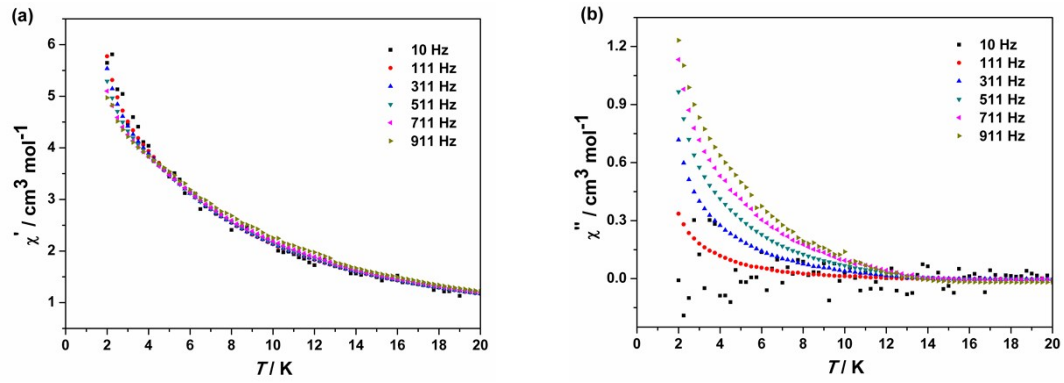


**Fig. S8** Temperature dependence of $\chi'$ (a) and $\chi''$ (b) signals of the *ac* susceptibilities under different frequency (Hz) for **4** ($H_{ac}$ = 3 Oe, $H_{dc}$ = 3000 Oe).