Electronic supplementary information

Near-infrared luminescence and magnetism of dinuclear complexes with different local symmetries constructed by *β*-diketonate coligand and bis-Schiff base ligand

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1. The instruments and test conditions

The elemental composition of the samples including C, H and N were analysed by a Perkin Elmer 240 CHN elemental analyzer. IR spectra were obtained on a Bruker TENSOR 27 spectrometer in 4000-400 cm^{-1} adopting the KBr pellet. Powder X-ray diffraction (PXRD) patterns were gained utilizing Cu/Kα radiation on a Rigaku D/Max 2500v/pc X-diffractometer in the region of 2θ = 5-50°. TGA were measured by a NETSCH 409 PC instrument during 30-800 °C in air. UV-Vis spectra were obtained by a TU-1901. Luminescence properties were recorded on an F-4500 FL spectrophotometer with a xenon arc lamp as the light source at room temperature. NIR spectra were acquired on a Nanolog FL3-2iHR infrared fluorescence spectrophotometer. Magnetic tests were completed utilizing the PPMS-9 ACMS magnetometer.

Single-crystal data of **1-5** were collected by the ω-ϕ scanning technique and the wavelength λ = 0.71073 Å on a computer-controlled Rigaku Saturn 724 CCD area detector diffractometer with confocal monochromated Mo-$K\alpha$ at in the range of temperature 113-133 K. The crystal structures were solved using direct means with the SHELXL-2018 program. In view of F^2 with SHELX-2018 program, the crystal structures were refined via full matrix least-squares methods. Anisotropic thermal parameters were allotted to all non-hydrogen atoms.

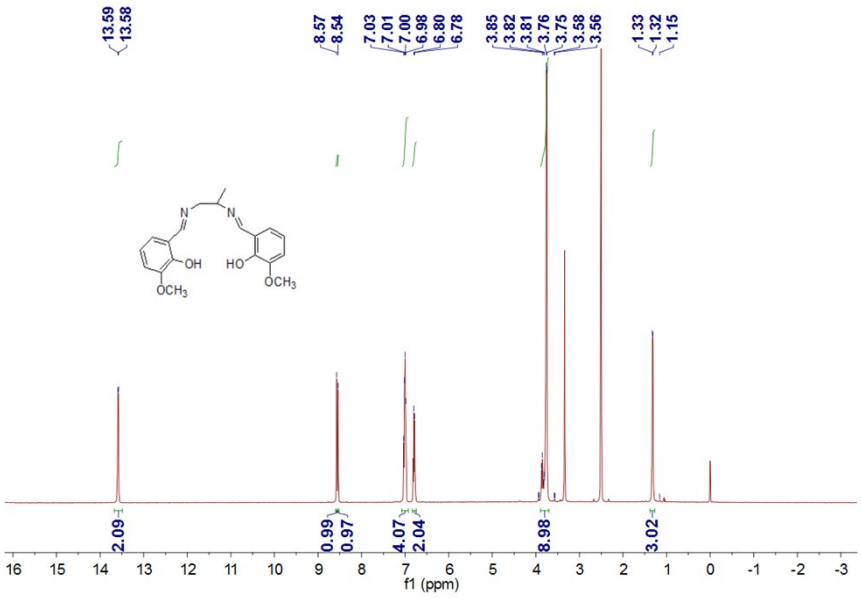


Fig. S1 ^{1}H NMR spectrum (400 MHz, d_6-DMSO) of H_2L.

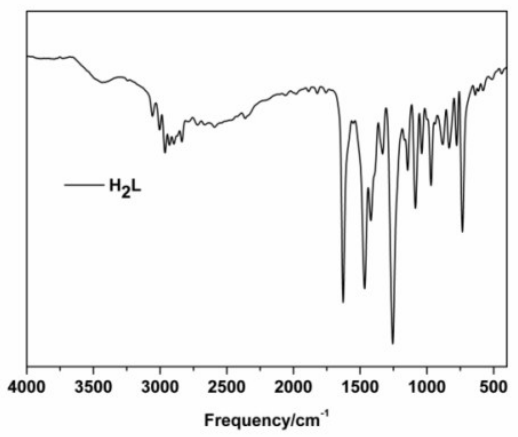


Fig. S2 IR spectra of a crystalline sample of H_2L.

Table S1 The important bond lengths (Å) and angles (°) of complexes **1**-**5**.

Complex	The range of Ln-O bond lengths / Å	The range of Ln-N bond lengths / Å	The range of Ln-O-Ln bond angles / °
1	2.277(3) - 2.685(3)	2.481(4) - 2.489(3)	110.52(11) - 113.31(11)
2	2.294(2) - 2.690(3)	2.487(3) - 2.494(3)	110.73(10) - 113.30(10)
3	2.277(4) - 2.675(4)	2.478(4) - 2.480(5)	110.83(14) - 113.53(14)
4	2.269(4) - 2.684(4)	2.470(5) - 2.477(5)	110.64(16) - 113.70(16)
5	2.238(4) - 2.678(5)	2.456(6) - 2.468(5)	110.24(17) - 113.67(19)

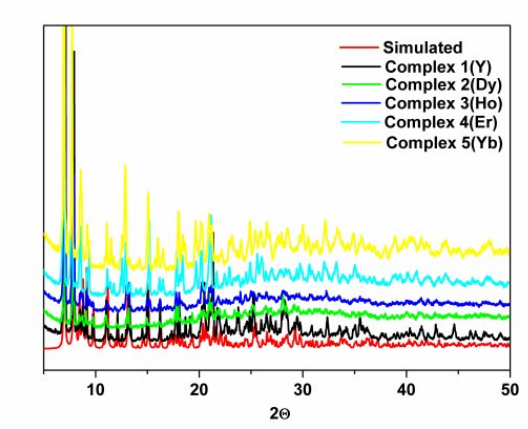


Fig. S3 PXRD patterns for complexes**1**-**5**.

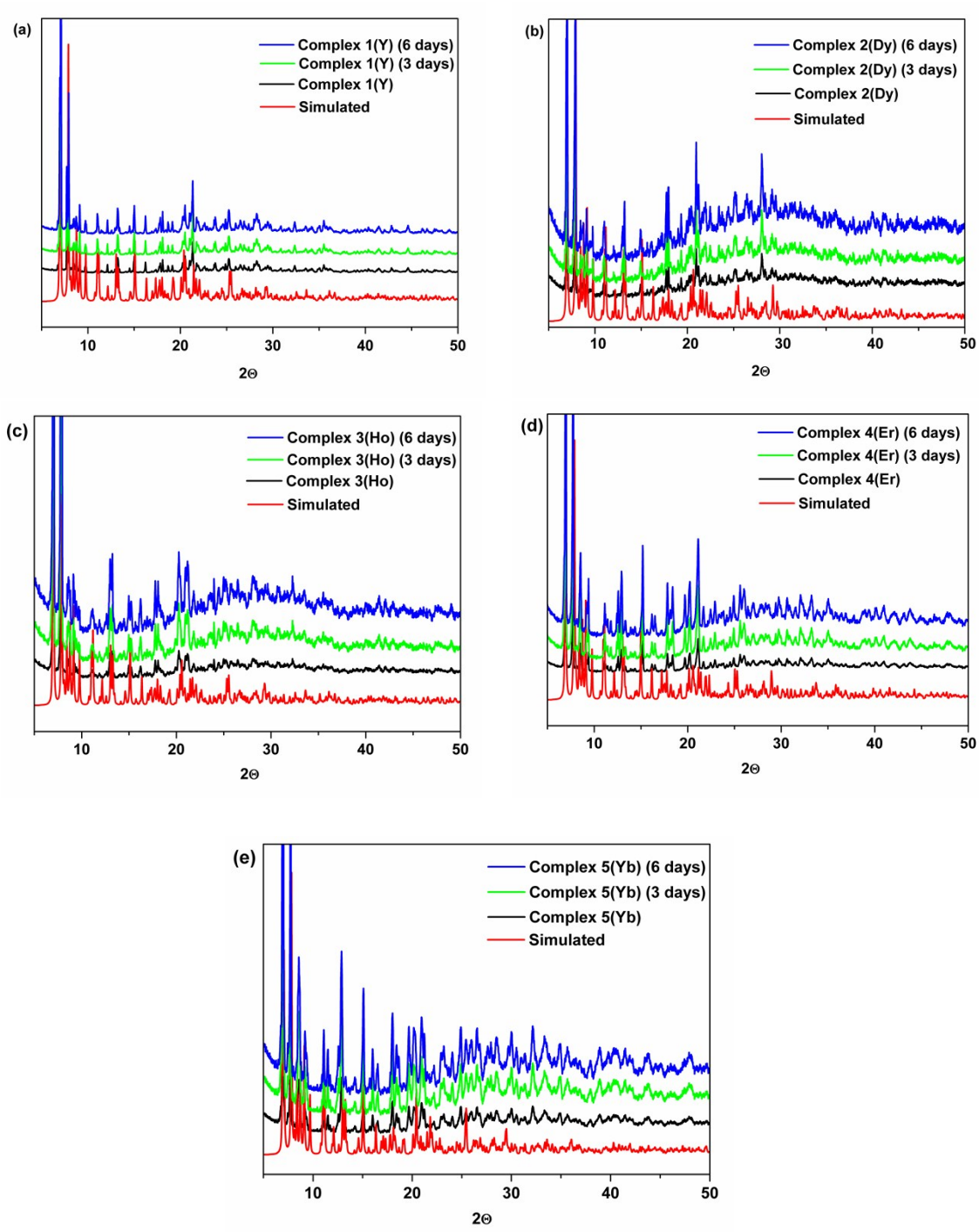


Fig. S4 PXRD patterns for complexes **1-5** exposed different times in the air.

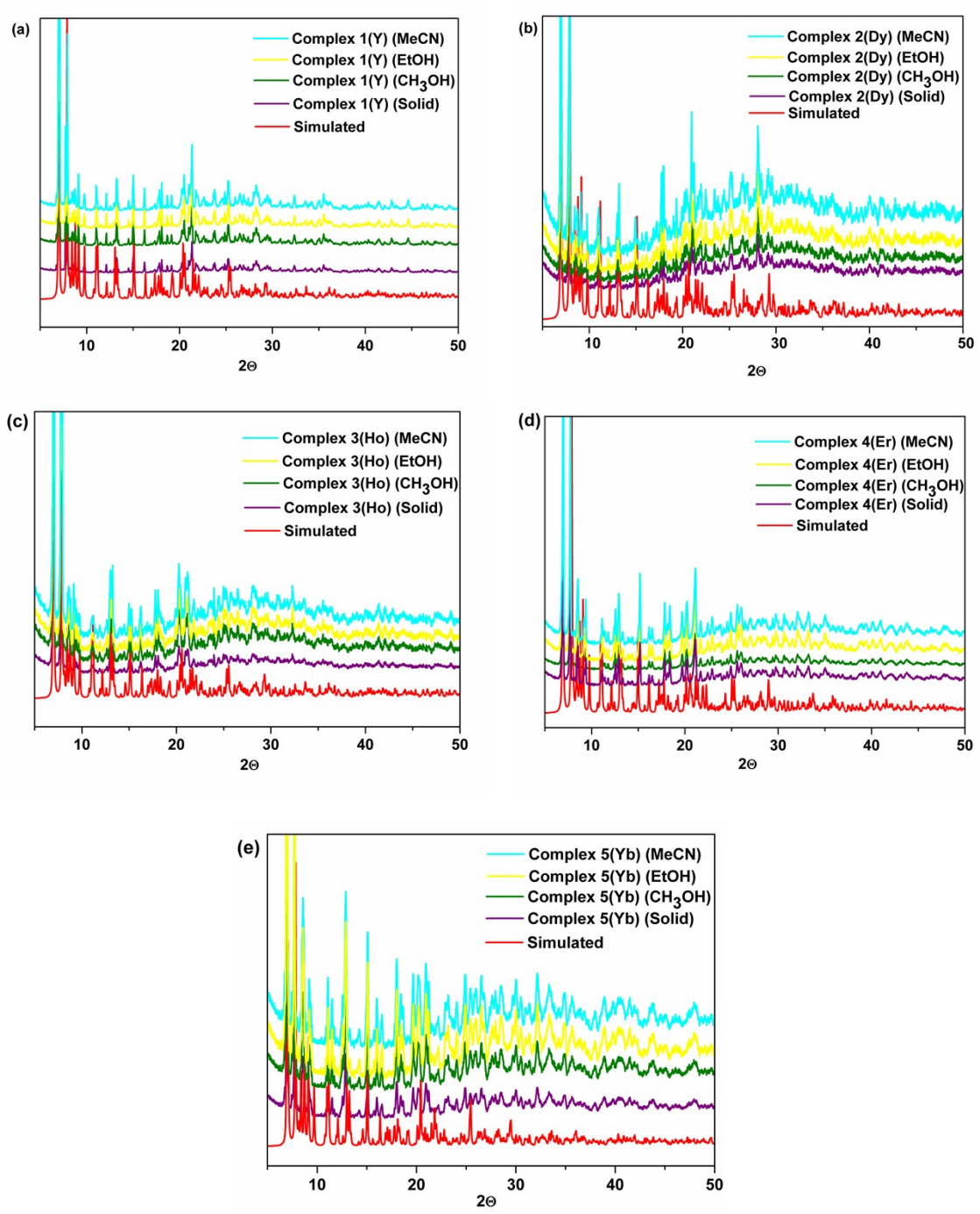


Fig. S5 PXRD patterns for complexes **1-5** in different solvents.

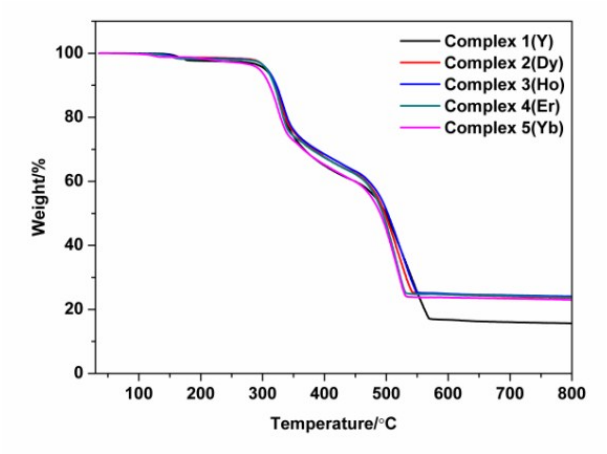
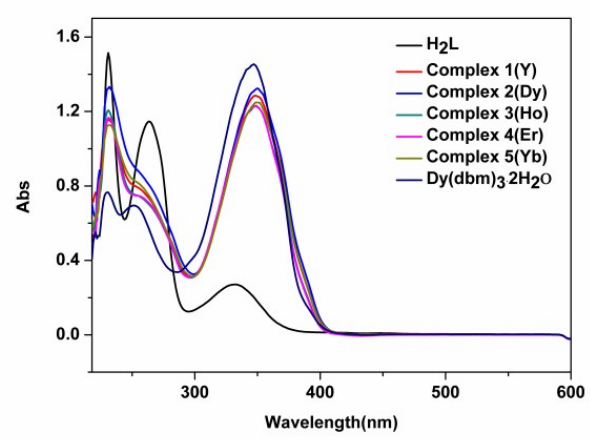


Fig. S6 TGA curves of complexes **1-5** on crystalline sample under the air atmosphere in the temperature range of 30-800 °C.



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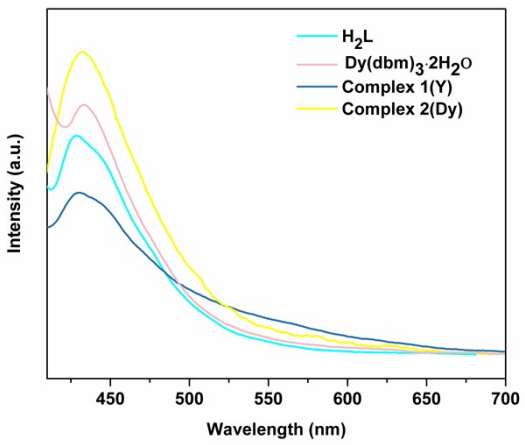

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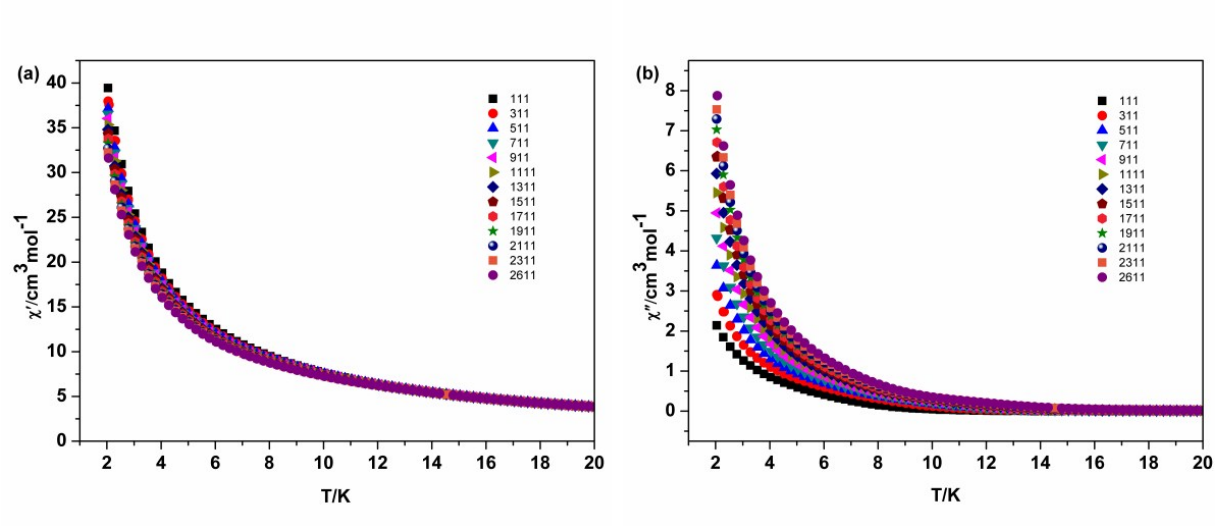

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