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SUPPORTING INFORMATION

Hybrid polymer thin films with lanthanide-zeolite A host-guest system: coordination bonding assembly and photo-integration

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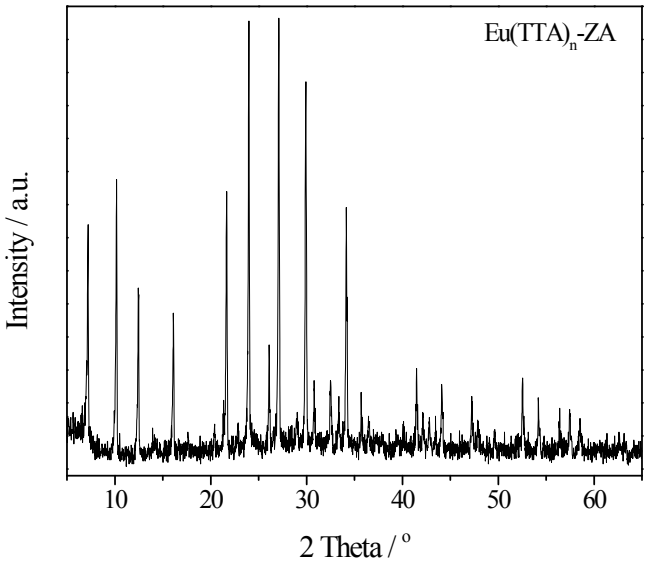

Figure S1 X-ray diffraction pattern of $Eu(TTA)_n$-ZA. After fabricating a certain amount of lanthanide complexes into the cages of zeolite A, the integrity of zeolite A framework is well maintained.

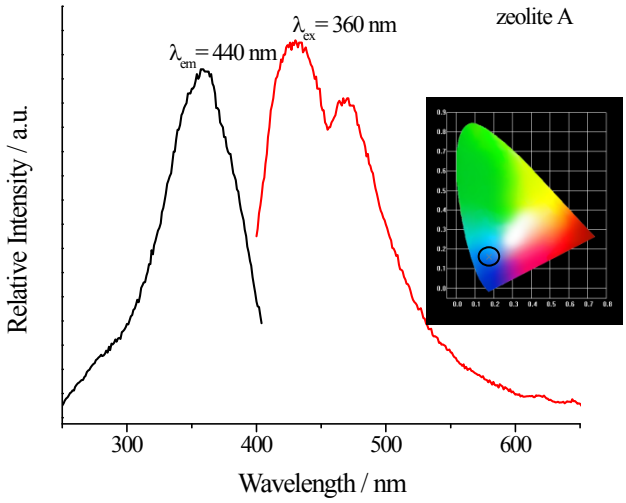

Figure S2 The excitation (black line) and emission spectra (red line) of zeolite A. The point of emission spectra in CIE chromaticity diagram is in the area of blue (CIE x: 0.1748; CIE y: 0.1597).

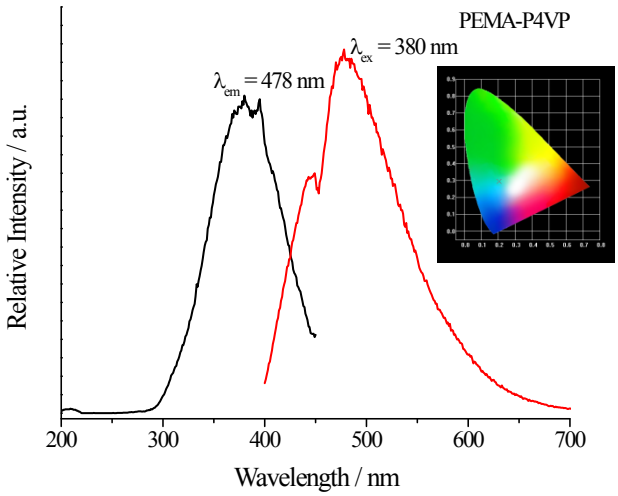

Figure S3 The excitation (black line) and emission spectra (red line) of pure organic polymer PEMA-P4VP and its CIE chromaticity diagram (CIE x: 0.2039; CIE y: 0.294).

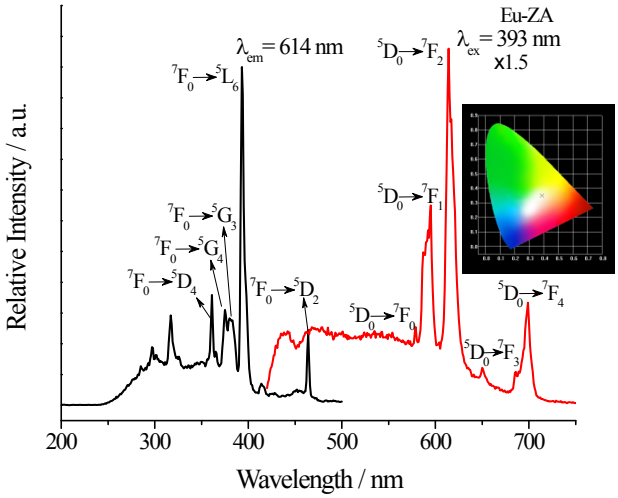

Figure S4 The excitation (black line) and emission spectra (red line) of Eu-ZA. The point of emission spectra in CIE chromaticity diagram is in the area of white (CIE x: 0.3872; CIE y: 0.3489).

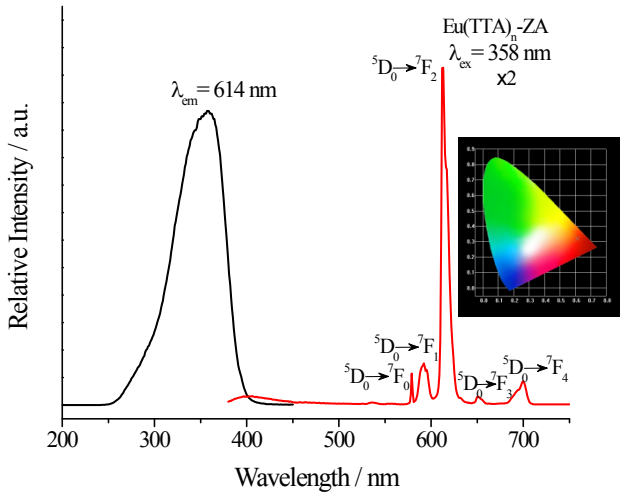

Figure S5 The excitation (black line) and emission spectra (red line) of $Eu(TTA)_n$ -ZA. The point of emission spectra in CIE chromaticity diagram is in the area of red (CIE x: 0.6114; CIE y: 0.3213).

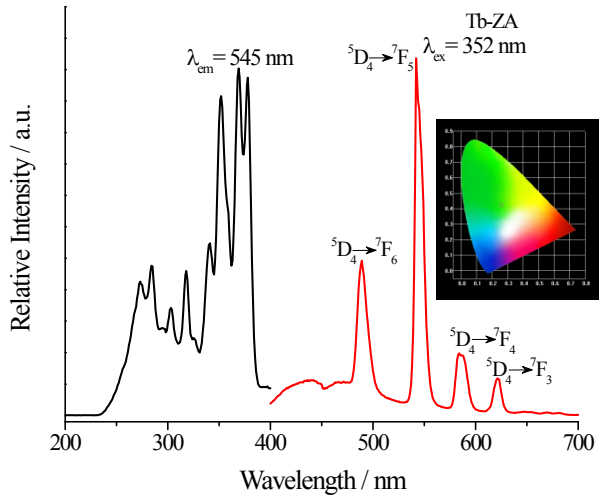

Figure S6 The excitation (black line) and emission spectra (red line) of Tb-ZA. The point of emission spectra in CIE chromaticity diagram is in the area of green (CIE x: 0.2605; CIE y: 0.4217).

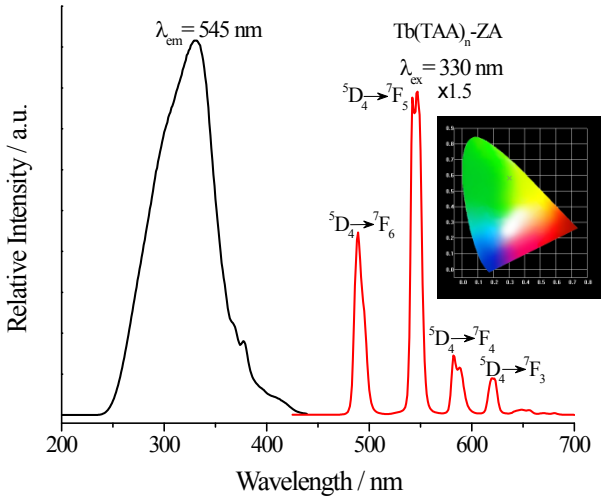

Figure S7 The excitation (black line) and emission spectra (red line) of $Tb(TAA)_n$-ZA. The point of emission spectra in CIE chromaticity diagram is in the area of green (CIE x: 0.3032; CIE y: 0.5823).

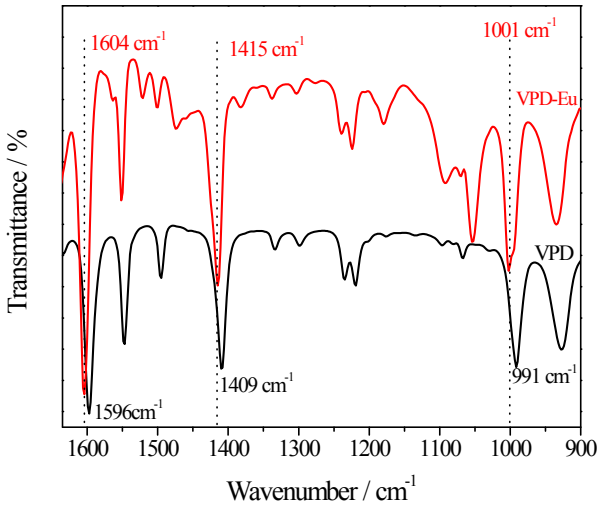

Figure S8 FTIR of VPD (black line) and VPD-Eu (red line). The interaction between polymer chain and lanthanide was via the coordination effects between VPD and lanthanide. Therefore, insight into the coordination interaction between PEMA-P4VP and lanthanide ions was gained by comparing the spectra of VPD and VPD-Eu. For pure VPD, the peaks at 1596, 1409 and 991 cm^{-1} are assigned to the characteristic vibrations of VPD. Compared with the spectra of pure VPD, the characteristic peaks of VPD have occurred red-shift for VPD-Eu complexes, indicating that there exists coordination effects between lanthanide and VPD or PEMA-P4VP. The coordination between VPD and lanthanide results in the electron distributions of VPD ring changing for the nitrogen atom of VPD tends to share a free-electron pair with the available f electron orbitals from lanthanide ions, thus leading to the shifts in spectra.[1, 2]

Reference

1. Z. C. Sun, F. Bai, H. M. Wu, D. M. Boye and H. Y. Fan, *Chem. Mater.*, 2012, **24**, 3415.
2. Z. Y. Li, R. J. Ma, A. Li, H. He, Y. L. An and L. Q. Shi, *Colloid. Polym. Sci.*, 2011, **289**, 1429.