Supplementary Information

S1. Differential absorption spectral shape between HPO and $Eu(hfa)_3(HPO)_2$

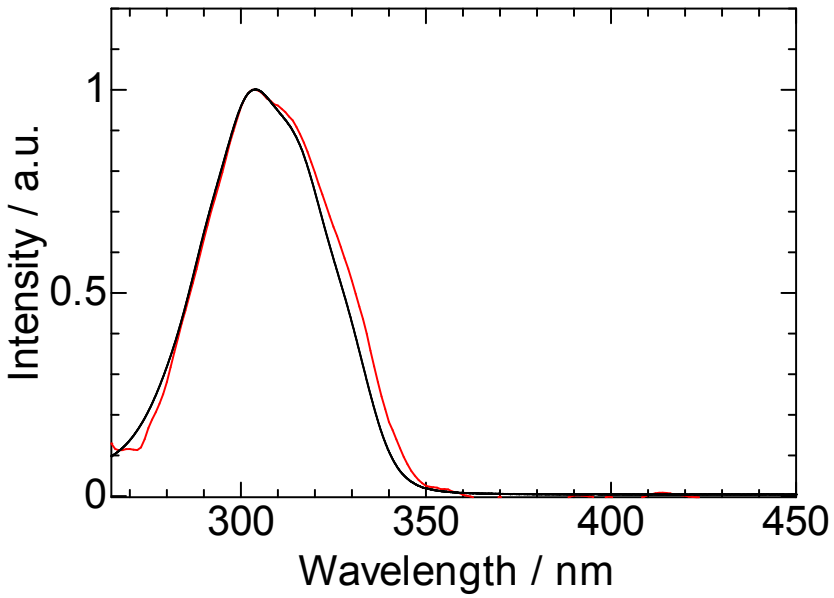

Figure S1. The differential electronic absorption spectrum between HPO and $Eu(hfa)(HPO)_2$ in $CHCl_3$ (red line), and electronic absorption spectrum of $Eu(hfa)(H_2O)_2$ in CH_3OH (black line). Normalized by intensity maxima.

S2. Electronic absorption spectra of HPO and $Eu(hfa)_3(HPO)_2$

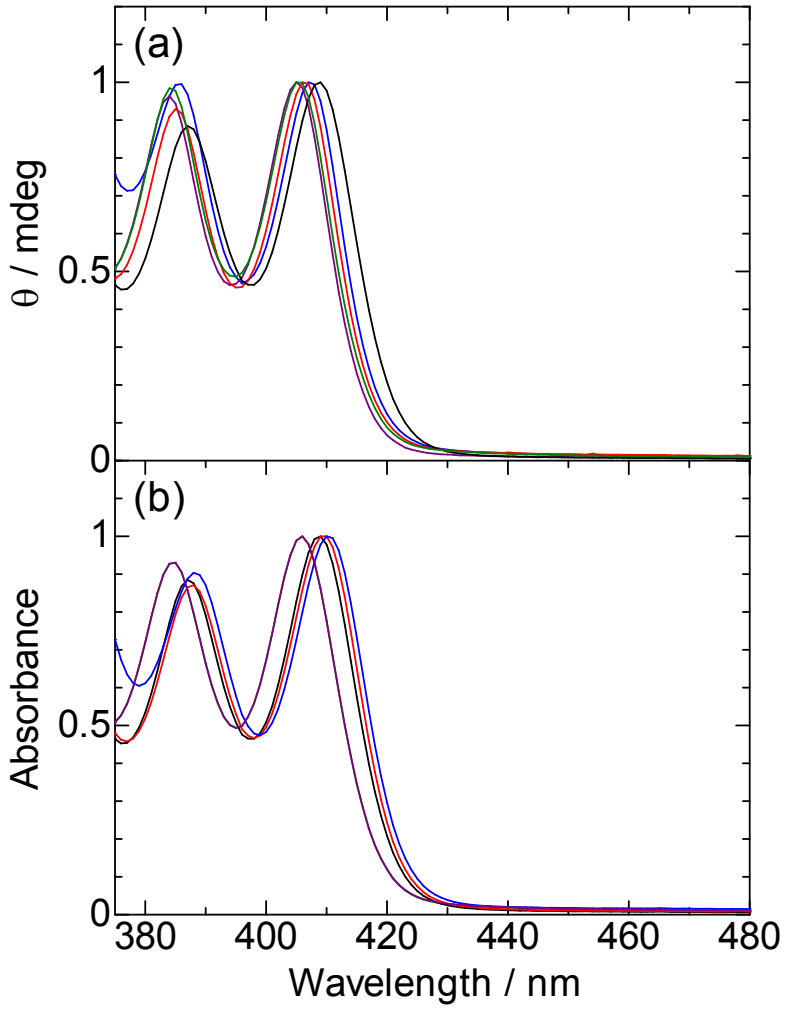

Figure S2. The electronic absorption spectra of HPO (a, 1.0×10^{-4} M) and $Eu(hfa)_3(HPO)_2$ (b, 1.0×10^{-4} M) (black line: $CHCl_3$, red line: C_2H_5Br, blue line: C_2H_5I, green line: CH_3COCH_3, purple line: CD_3COCD_3). Normalized by intensity maxima.

S3. Fluorescence spectra of HPO ligand

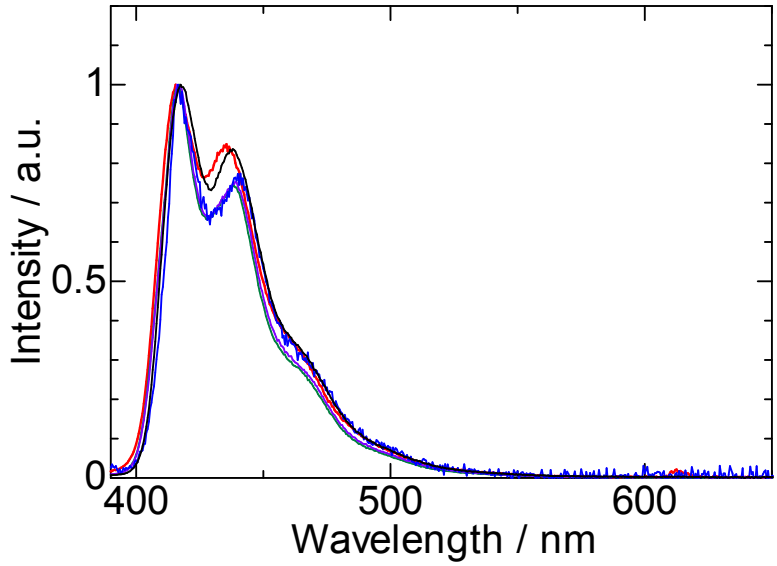

Figure S3. The fluorescence spectra of HPO (λ_{ex} = 370 nm, 1.0 × 10^{-4} M) (black line: $CHCl_3$, red line: C_2H_5Br, blue line: C_2H_5I, green line: CH_3COCH_3, purple line: CD_3COCD_3). Normalized by intensity maxima.

S4. Excitation spectra of $Eu(hfa)_3(HPO)_2$ ligand

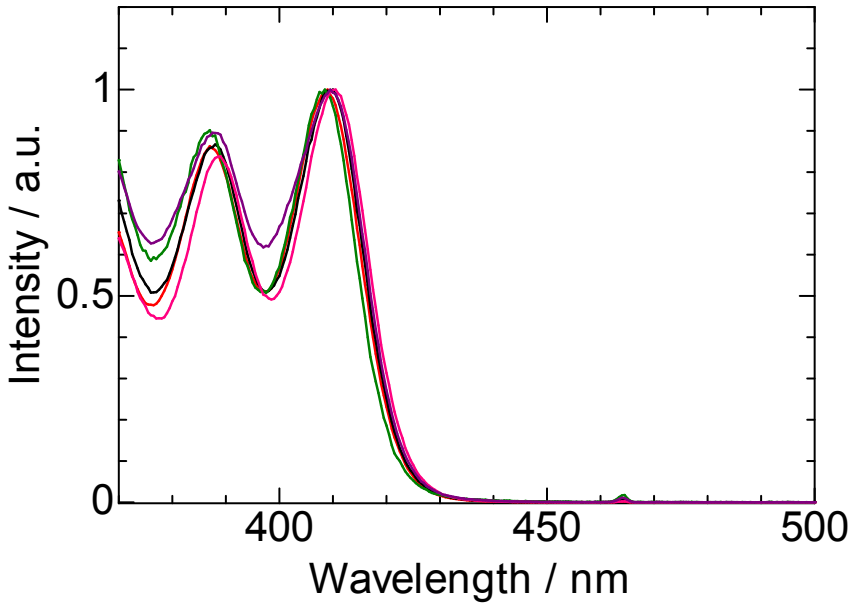

Figure S4. Excitation spectra (λ_{ex} = 613 nm, 1.0 × 10^{-4} M) of $Eu(hfa)_3(HPO)_2$ (black line: $CHCl_3$, red line: C_2H_5Br, blue line: C_2H_5I, green line: CH_3COCH_3, purple line: CD_3COCD_3). Normalized by intensity maxima.

S5. Luminescence spectra of HPO

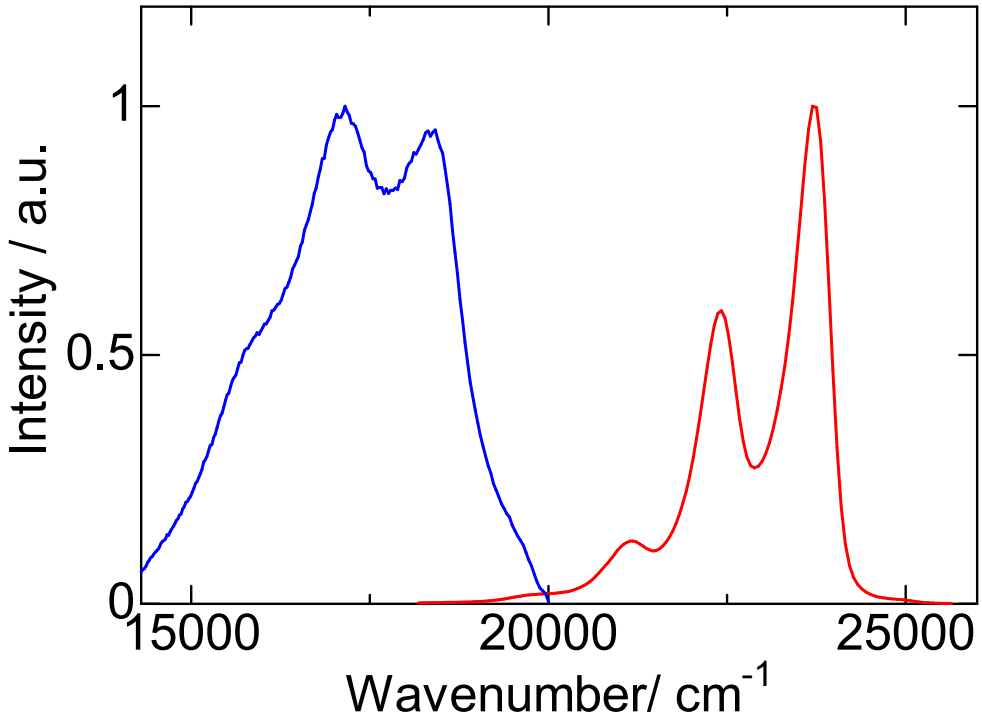

Figure S5. Fluorescence (red line) and phosphorescence (blue line) spectra of HPO in solutions.[29] Normalized by intensity maxima.

S6. DFT calculation results

Table S1. TD-DFT calculation (B3LYP/6-31G(d)) for HPO ligand.

	λ_{abs}/nm	f	main contribution
S_1	369	0.0009	H-1→L (53 %), H→L+1 (39 %)
S_2	349	0.0871	H→L (71 %), H-1→L+1 (21 %)
S_3	320	0.3935	H→L (16 %), H-1→L+1 (59 %)
S_4	315	0.0377	H-1→L (28 %), H→L+1 (31 %), H-2→L (23 %)