**ELECTRONIC SUPPLEMENTARY INFORMATION**

# $Eu^{3+}$@PMO: Synthesis, Characterization and Luminescence Properties.

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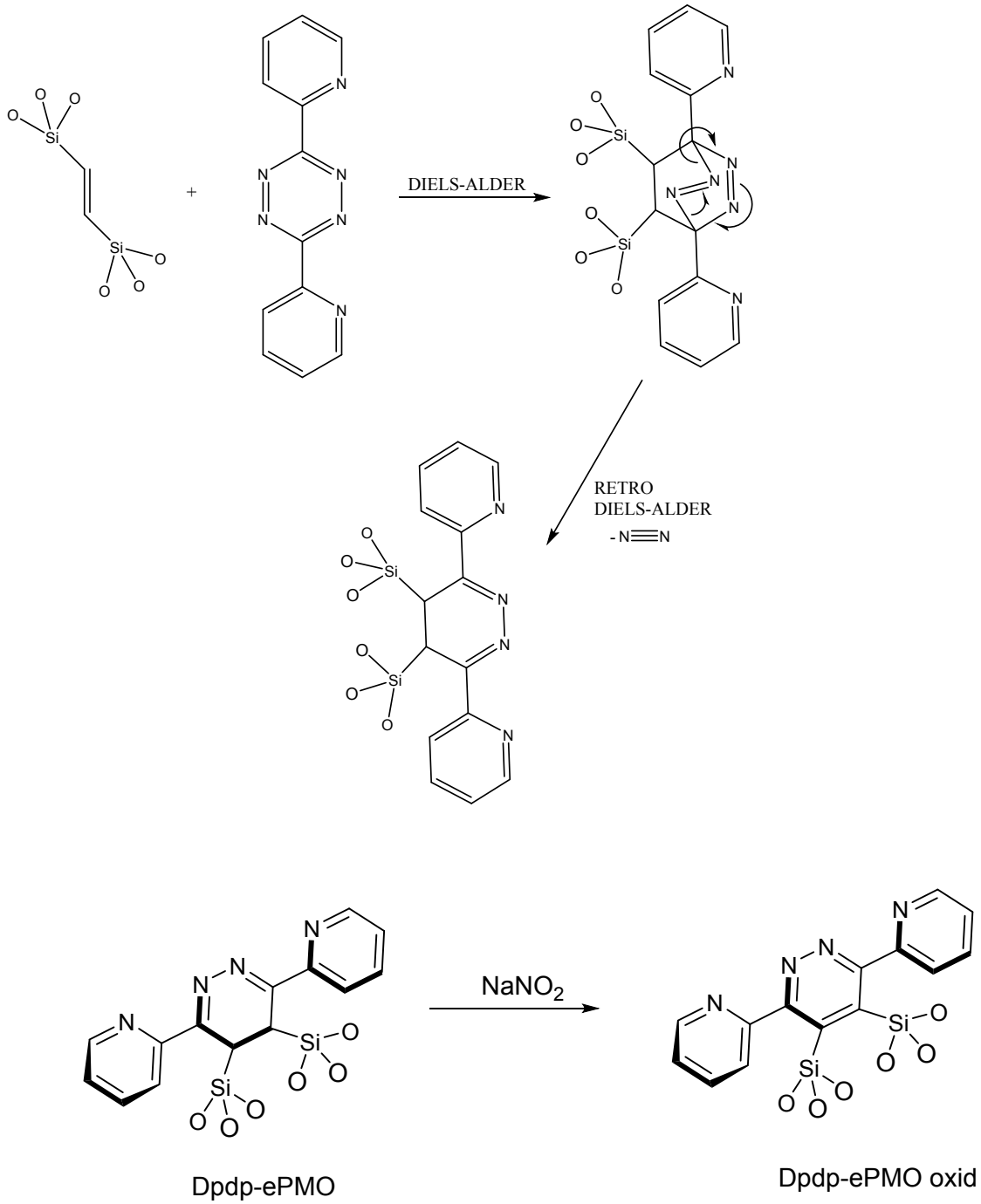
**Table S1.** Change in CIE color coordinates and CCT values when exciting Dpdp-ePMO-$EuCl_3$ at different wavelengths.

| Wavelength (nm) | CIE x | CIE y | CCT (K) |
|---|---|---|---|
| 250.0 | 0.4217 | 0.4318 | 3481 |
| 260.0 | 0.4223 | 0.4319 | 3470 |
| 270.0 | 0.4254 | 0.4301 | 3402 |
| 280.0 | 0.4240 | 0.4281 | 3413 |
| 290.0 | 0.4262 | 0.4285 | 3376 |
| 300.0 | 0.4274 | 0.4328 | 3385 |
| 302.0 | 0.4002 | 0.4236 | 3385 |
| 310.0 | 0.4270 | 0.4393 | 3437 |
| 320.0 | 0.4266 | 0.4426 | 3466 |
| 330.0 | 0.4260 | 0.4429 | 3479 |
| 340.0 | 0.4245 | 0.4414 | 3495 |
| 350.0 | 0.4219 | 0.4399 | 3532 |
| 360.0 | 0.4203 | 0.4386 | 3552 |
| 370.0 | 0.4195 | 0.4382 | 3564 |
| 380.0 | 0.4191 | 0.4390 | 3577 |

**Table S2.** Change in CIE color coordinates and CCT values when exciting Dpdp-ePMO-Eu(tta)$_3$ at different wavelengths.

| Wavelength (nm) | CIE x | CIE y | CCT (K) |
|---|---|---|---|
| 250.0 | 0.4234 | 0.4268 | 3414 |
| 260.0 | 0.4178 | 0.4280 | 3527 |
| 270.0 | 0.4211 | 0.4252 | 3446 |
| 280.0 | 0.4239 | 0.4218 | 3368 |
| 290.0 | 0.4478 | 0.4414 | 3195 |
| 298.0 | 0.4945 | 0.4871 | 2790 |
| 300.0 | 0.4591 | 0.4465 | 3256 |
| 310.0 | 0.4215 | 0.4346 | 3503 |
| 320.0 | 0.4167 | 0.4381 | 3614 |
| 330.0 | 0.4157 | 0.4376 | 3630 |
| 340.0 | 0.4129 | 0.4358 | 3671 |
| 350.0 | 0.4085 | 0.4334 | 3742 |
| 360.0 | 0.4049 | 0.4315 | 3802 |
| 370.0 | 0.4024 | 0.4316 | 3854 |
| 380.0 | 0.4014 | 0.4334 | 3885 |




**Scheme S1.** Reaction mechanism for the hetero Diels-Alder cycloaddition between the double bonds on ethene-PMO (ePMO) and tetrazine derivative (top). Complete oxidation of dipyridyl-dihydropyridazine functionalized ethene-PMO with $NaNO_2$.

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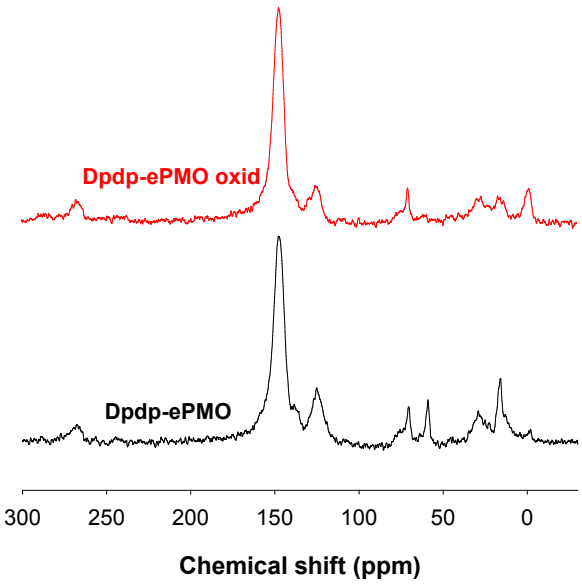
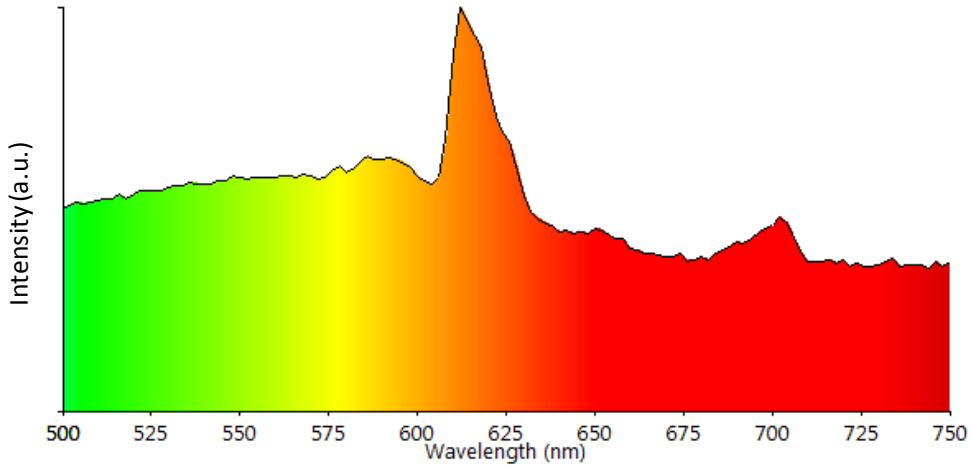



**Figure S1.** $^{13}C$ CP/MAS NMR spectra of Dpdp-ePMO and Dpdp-ePMO oxid materials.



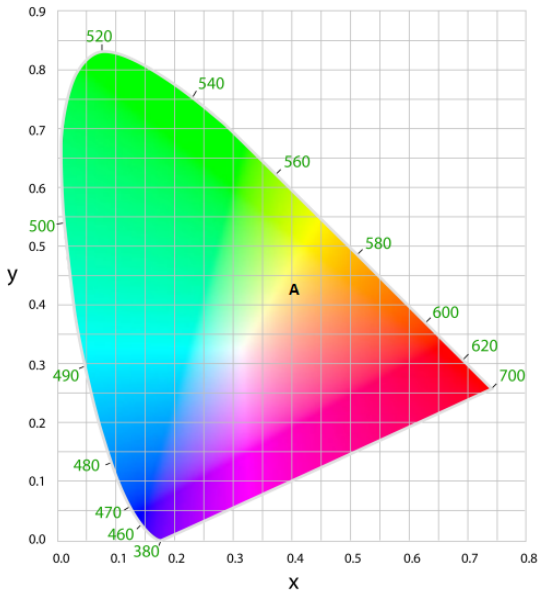




**Figure S2.** Top: emission spectrum of Dpdp-ePMO-$EuCl_3$ excited at 302.0 nm, plotted with a rainbow curve. Bottom: CIE color coordinate diagram of the sample when excited at this wavelength (point A marks the exact coordinates).

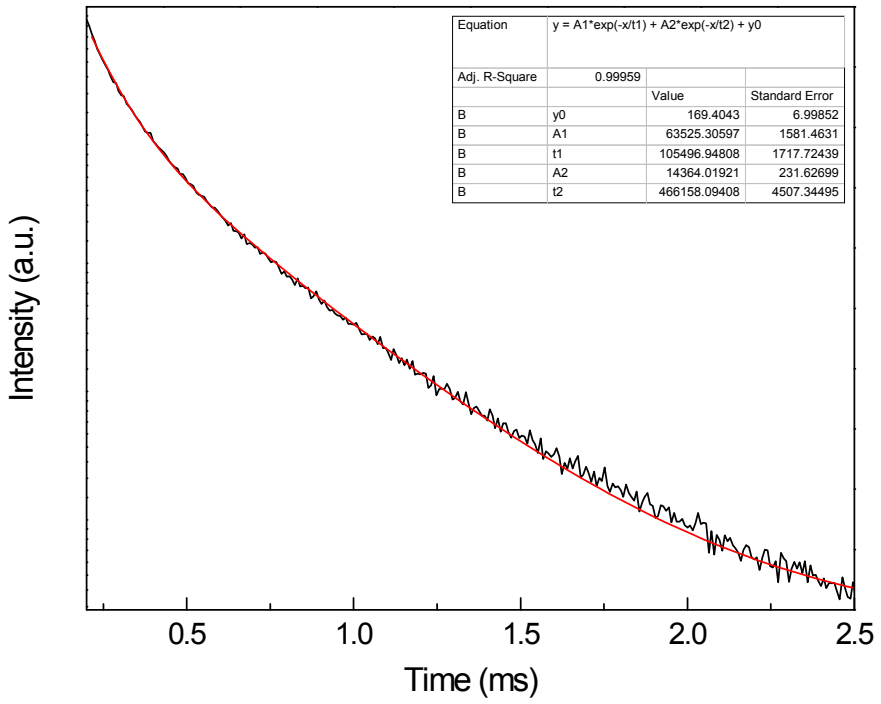



**Figure S3.** Luminescence decay profile of Dpdp-ePMO-$EuCl_3$ excited at 302.0 nm and monitored at 612.0 nm.

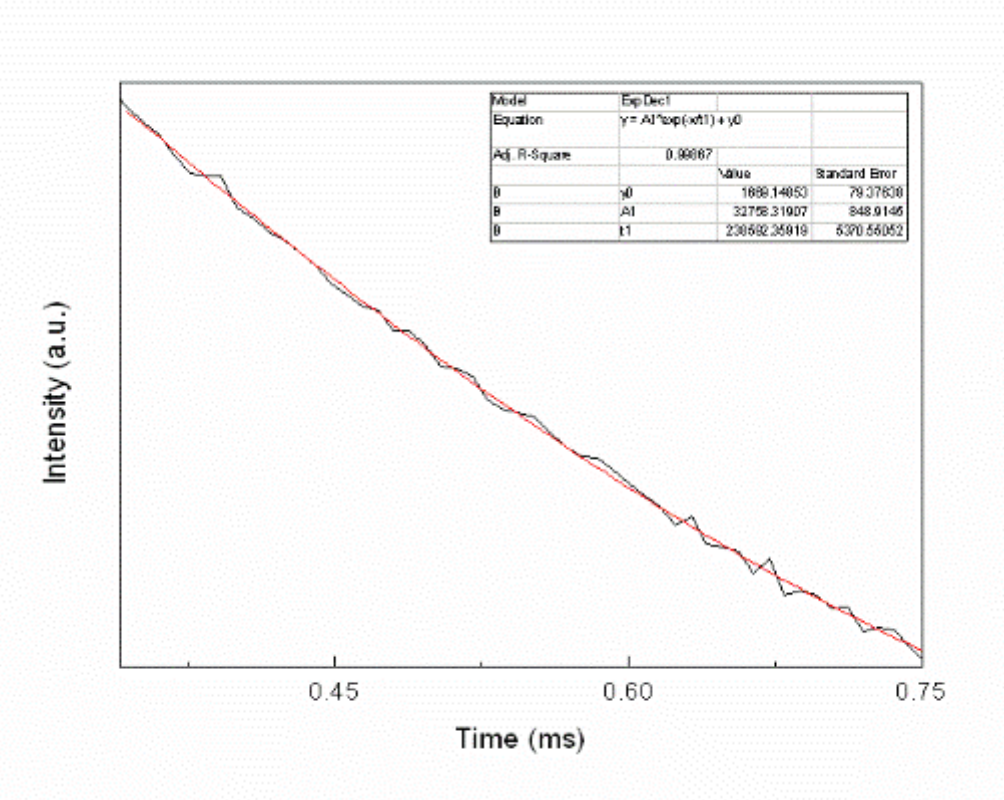
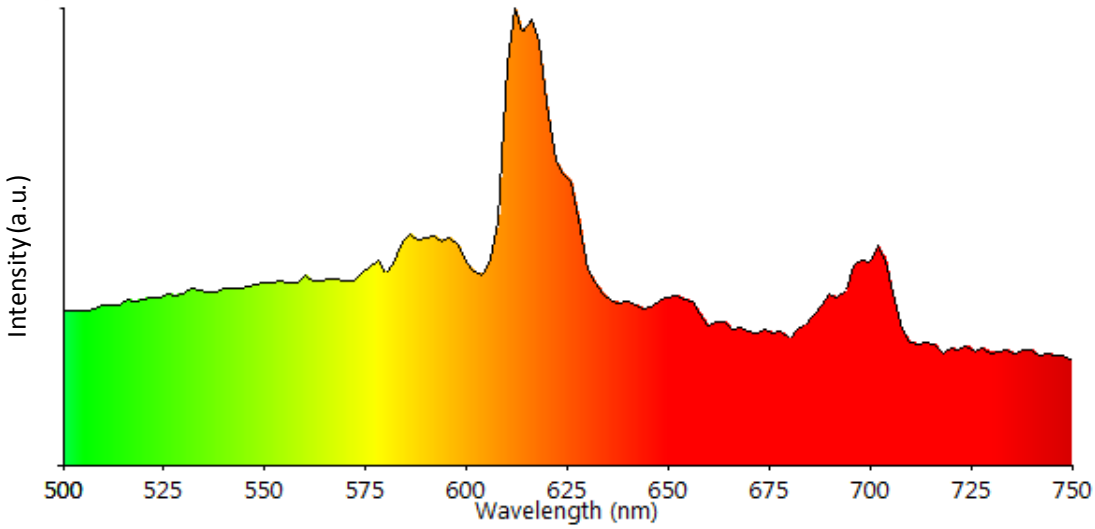



**Figure S4.** Luminescence decay profile of pure complex $EuCl_3$bptz excited at 302.0 nm and monitored at 612.0 nm.



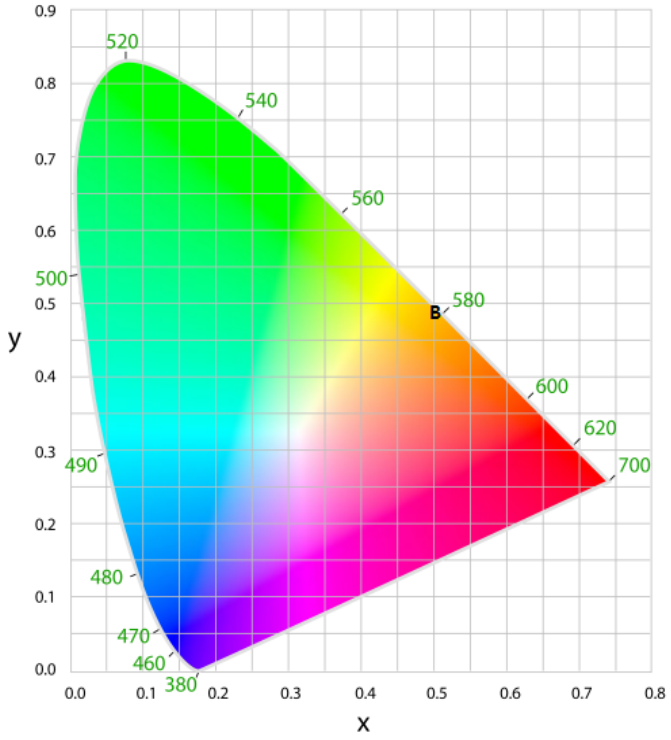




**Figure S5.** Top: emission spectrum of Dpdp-ePMO-Eu(tta)$_3$ excited at 298.0 nm, plotted with a rainbow curve. Bottom: CIE color coordinate diagram of the sample when excited at this wavelength (point B marks the exact coordinates).

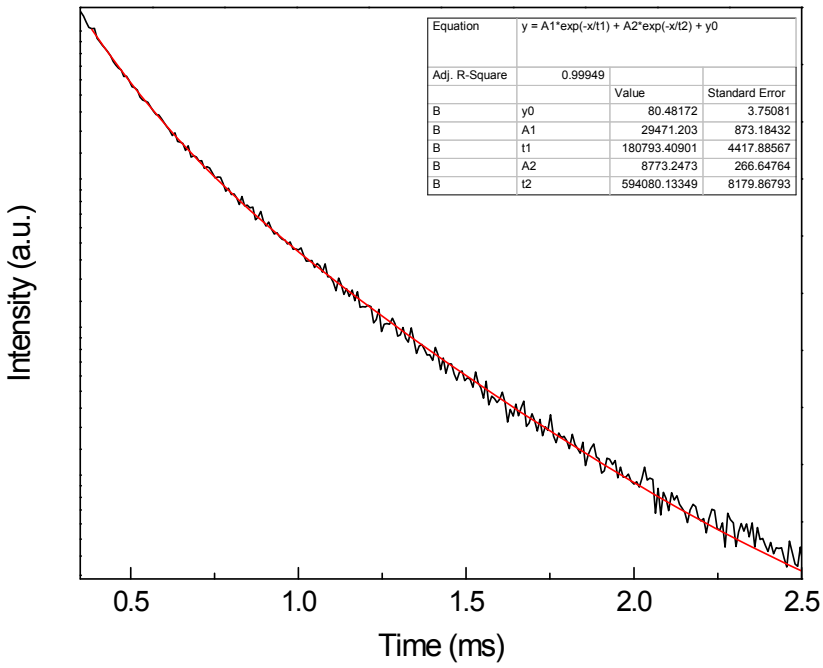



**Figure S6.** Luminescence decay profile of Dpdp-ePMO-Eu(tta)$_3$ excited at 298.0 nm and monitored at 612.0 nm.

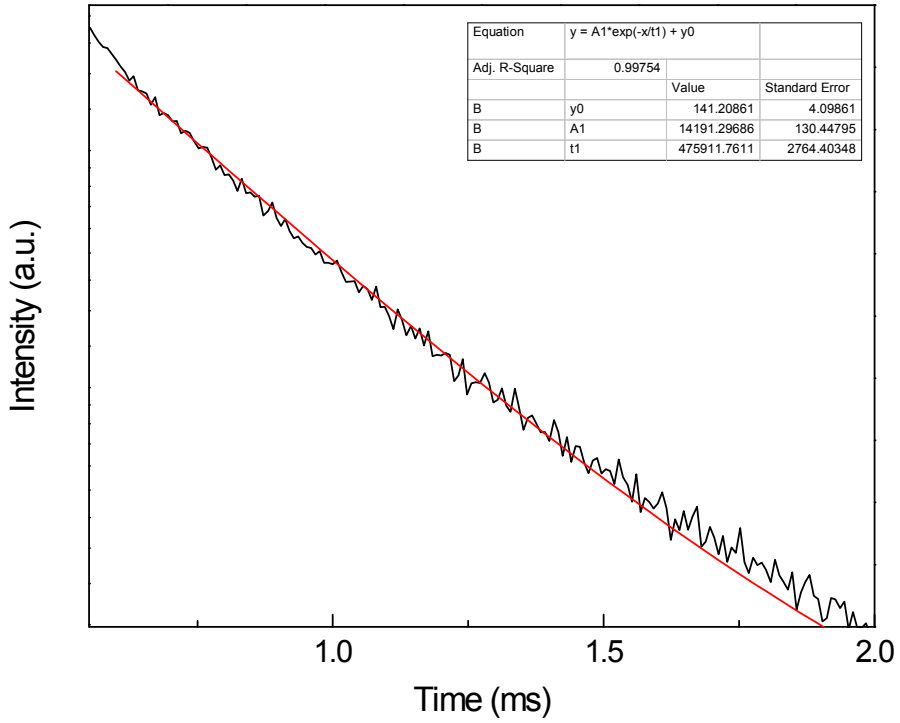



**Figure S7.** Luminescence decay profile of pure complex $Eu(tta)_3bptz$ excited at 298.0 nm and monitored at 612.0 nm.

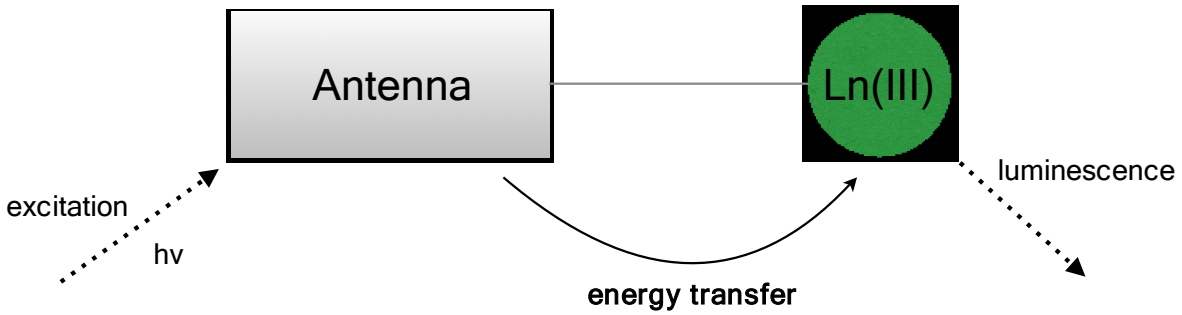



**Figure S8.** Schematic illustration of the "antenna effect", wherein the incident excitation is first absorbed by a organic ligand and than transferred to the Ln(III) metal.

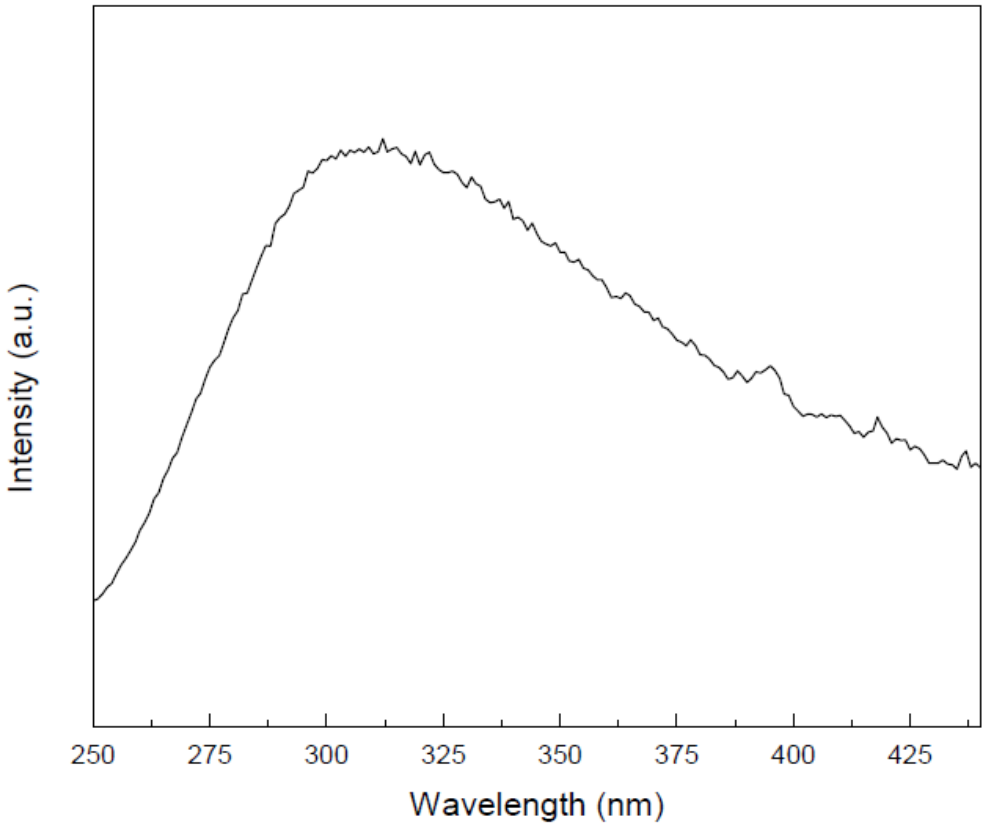



**Figure S9.** Excitation spectrum of Dpdp-ePMO material