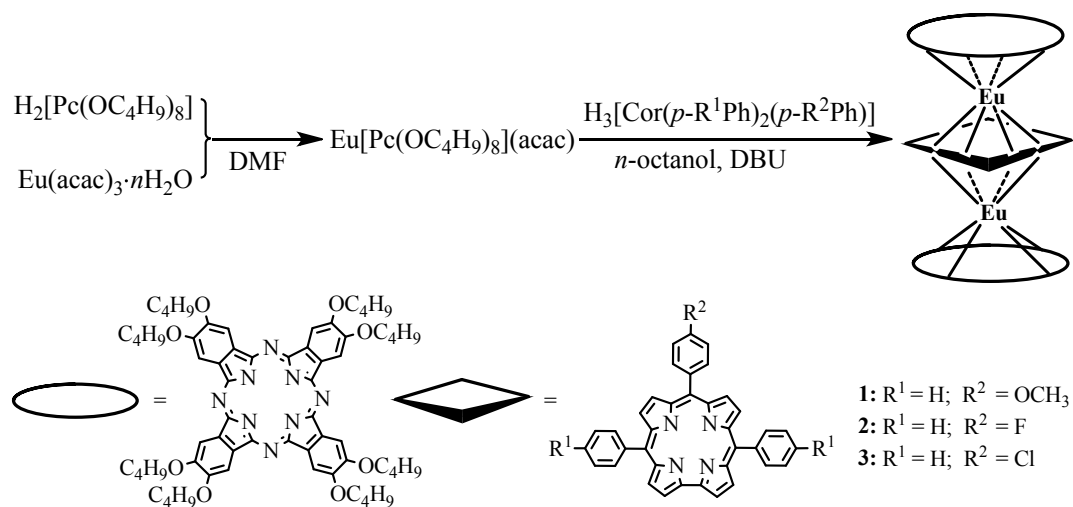


## Electronic Supplementary Information

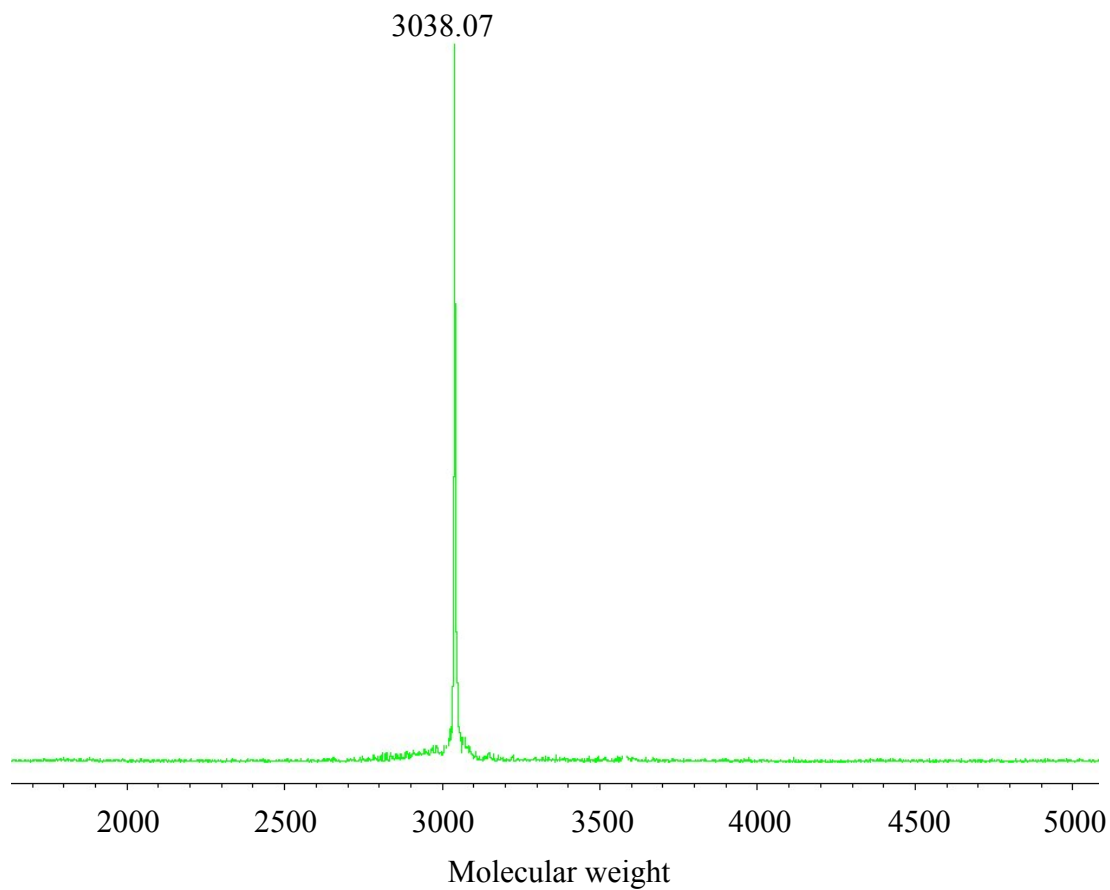
### **Construction of mixed corrole-phthalocyanine europium triple-decker complexes involving *meso*-substituted *trans*-A<sub>2</sub>B-corrole**

Guifen Lu,\* Cheng He, Yuanyuan Fang, Liping Wang and Weihua Zhu

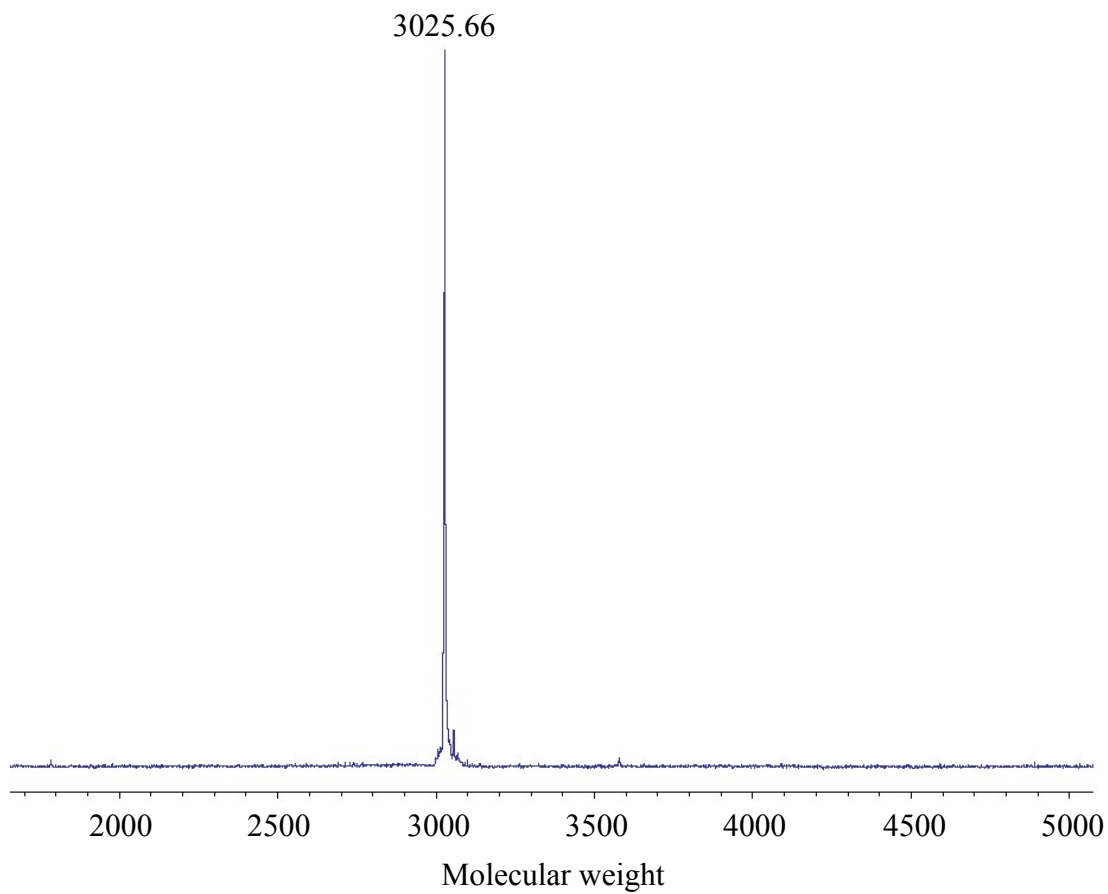
*School of Chemistry and Chemical Engineering, Jiangsu University, Zhenjiang 212013, P. R. China.*



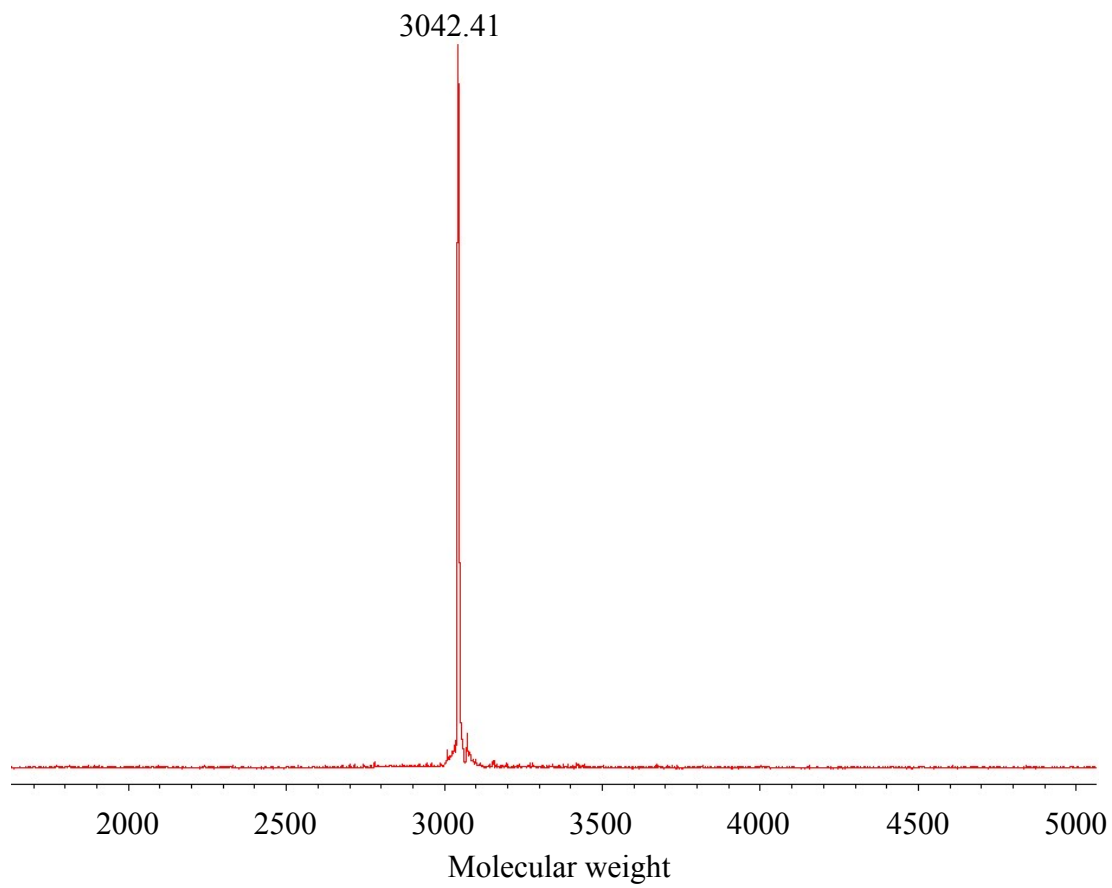
**Scheme S1.** Synthesis of europium triple decker complexes **1-3** with *meso*-substituted *trans*-A<sub>2</sub>B-corrolato and phthalocyaninato ligands.



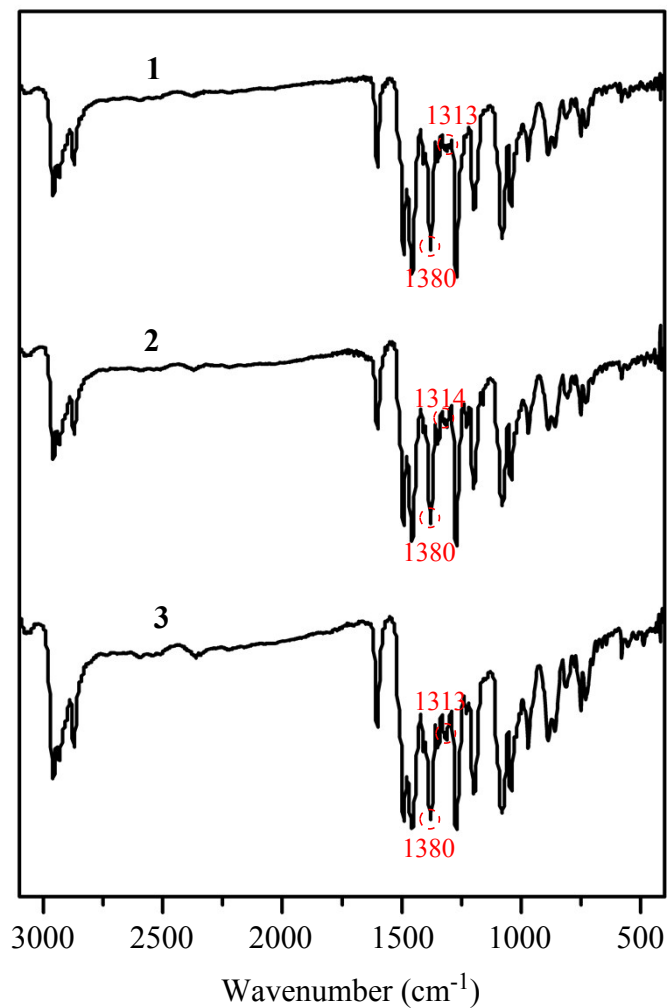
**Fig. S1.** MALDI-TOF mass spectrum of  $\text{Eu}_2[\text{Pc}(\text{OC}_4\text{H}_9)_8]_2[\text{Cor}(p\text{-HPh})_2(p\text{-CH}_3\text{OPh})]$  **1**.



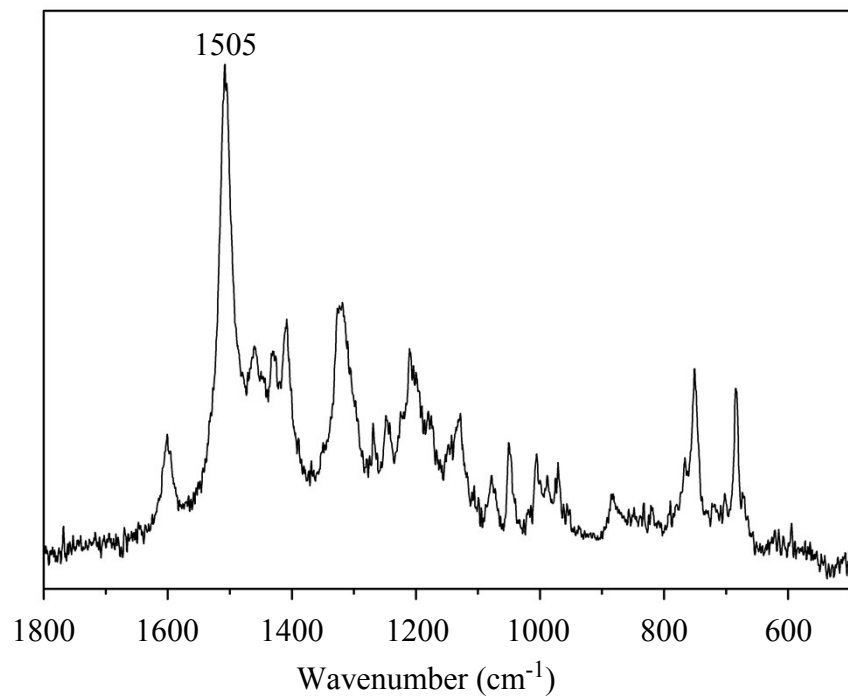
**Fig. S2.** MALDI-TOF mass spectrum of  $\text{Eu}_2[\text{Pc}(\text{OC}_4\text{H}_9)_8]_2[\text{Cor}(p\text{-HPh})_2(p\text{-FPh})]$  **2**.



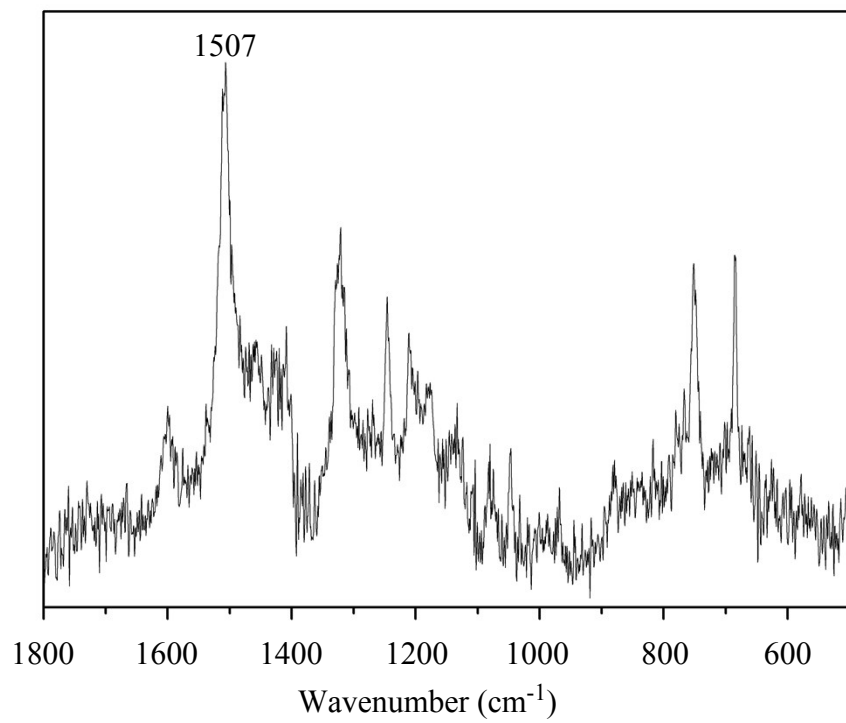
**Fig. S3.** MALDI-TOF mass spectrum of  $\text{Eu}_2[\text{Pc}(\text{OC}_4\text{H}_9)_8]_2[\text{Cor}(p\text{-HPh})_2(p\text{-ClPh})]$  **3**.



**Fig. S4.** IR spectra of compounds **1-3** in the region 400-3100 cm<sup>-1</sup> with 2 cm<sup>-1</sup> resolution, showing the diagnostic IR marker bands at 1313 and 1380 cm<sup>-1</sup> for [Pc(OC<sub>4</sub>H<sub>9</sub>)<sub>8</sub>]<sup>2-</sup>.

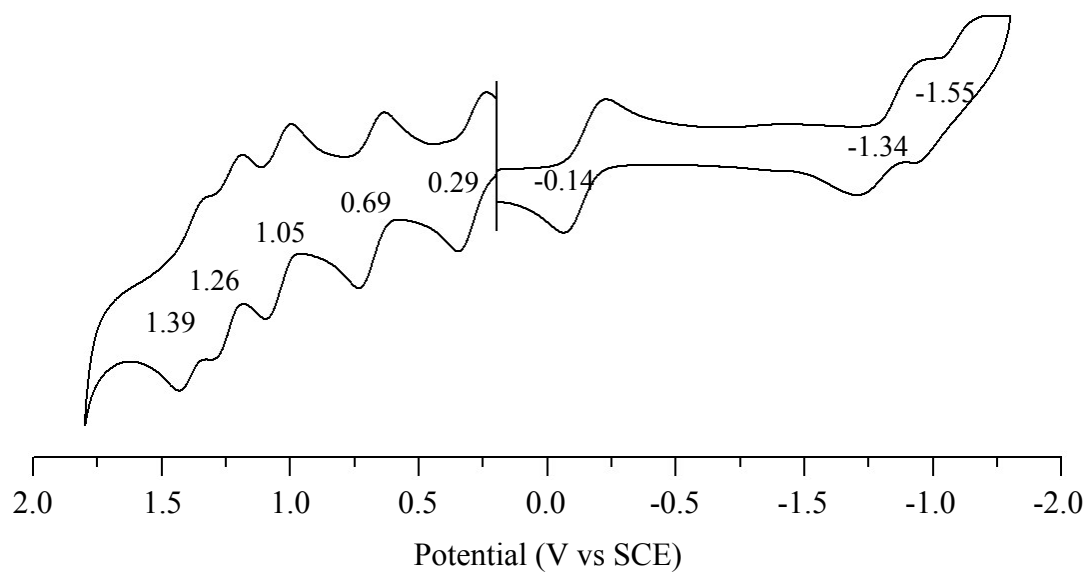


**Fig. S5.** Raman spectrum of  $\text{Eu}_2[\text{Pc}(\text{OC}_4\text{H}_9)_8]_2[\text{Cor}(p\text{-HPh})_2(p\text{-CH}_3\text{OPh})]$  **1** with excitation at 633 nm.

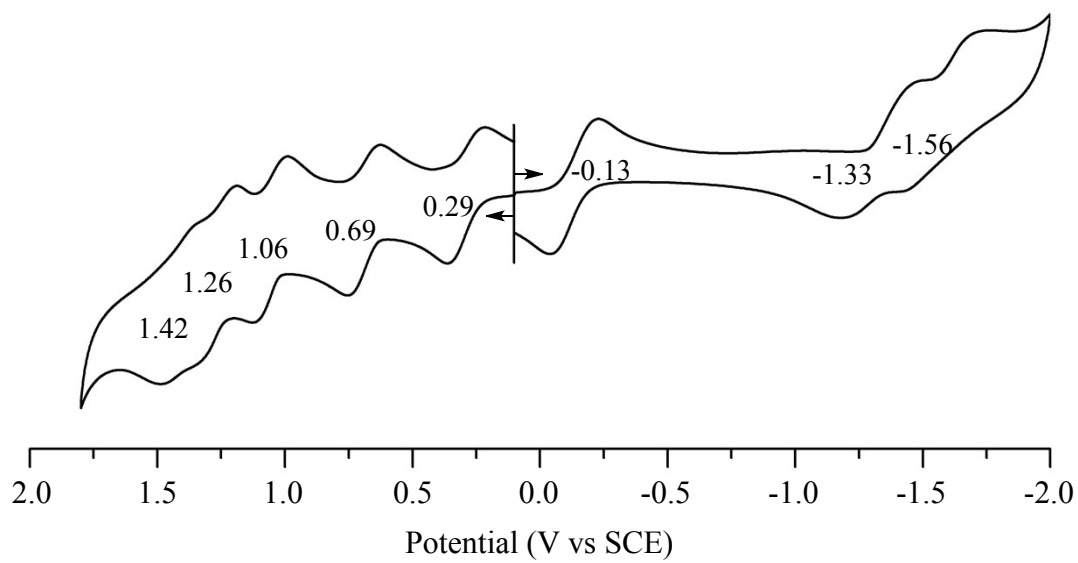


**Fig. S6.** Raman spectrum of  $\text{Eu}_2[\text{Pc}(\text{OC}_4\text{H}_9)_8]_2[\text{Cor}(p\text{-HPh})_2(p\text{-FPh})]$  **2** with excitation at 633 nm.





**Fig. S7.** Cyclic voltammogram of  $\text{Eu}_2[\text{Pc}(\text{OC}_4\text{H}_9)_8]_2[\text{Cor}(p\text{-HPh})_2(p\text{-FPh})]$  **2** in  $\text{CH}_2\text{Cl}_2$  containing 0.1 M TBAP.



**Fig. S8.** Cyclic voltammogram of  $\text{Eu}_2[\text{Pc}(\text{OC}_4\text{H}_9)_8]_2[\text{Cor}(\rho\text{-HPh})_2(\rho\text{-ClPh})]$  **3** in  $\text{CH}_2\text{Cl}_2$  containing 0.1 M TBAP.

**Table S1.** Electronic absorption data for  $\text{Eu}_2[\text{Pc}(\text{OC}_4\text{H}_9)_8]_2[\text{Cor}(p\text{-R}^1\text{Ph})_2(p\text{-R}^2\text{Ph})]$  (**1-4**) in  $\text{CH}_2\text{Cl}_2$ .

cpd	R <sup>1</sup>	R <sup>2</sup>	$\lambda_{\text{max}}/\text{nm}$ ( $\log\epsilon$ )					re f
<b>1</b>	H	CH <sub>3</sub> O	293 (5.04)	351 (5.17)	421 (4.69)	533 (4.36) <sup>a</sup>	686 (4.73)	<i>tw</i>
<b>2</b>	H	F	293 (5.21)	352 (5.30)	421 (4.91)	531 (4.57) <sup>a</sup>	682 (4.80)	<i>tw</i>
<b>3</b>	H	Cl	293 (5.21)	351 (5.32)	421 (4.90)	532 (4.54) <sup>a</sup>	680 (4.85)	<i>tw</i>
<b>4</b>	H	NO <sub>2</sub>	294 (5.28)	351 (5.36)	425 (4.97)	542 (4.66) <sup>a</sup>	674 (4.93)	1

<sup>a</sup> Broad and weak band. *tw* = this work.

**Table S2.** The main Q band and corresponding energy of the compounds  $\text{Eu}_2[\text{Pc}(\text{OC}_4\text{H}_9)_8]_2[\text{Cor}(p\text{-R}^1\text{Ph})_2(p\text{-R}^2\text{Ph})]$  (**1-4**) in  $\text{CH}_2\text{Cl}_2$ .

cpd	substituent			Q band/nm <sup>a</sup>	E/eV <sup>b</sup>	ref
	R <sup>1</sup>	R <sup>2</sup>	$\Sigma \sigma$			
<b>1</b>	H	CH <sub>3</sub> O	-0.27	686	1.809	<i>tw</i>
<b>2</b>	H	F	0.06	682	1.819	<i>tw</i>
<b>3</b>	H	Cl	0.23	680	1.825	<i>tw</i>
<b>4</b>	H	NO <sub>2</sub>	0.78	674	1.841	1

<sup>a</sup> The main Q band of the compounds  $\text{Eu}_2[\text{Pc}(\text{OC}_4\text{H}_9)_8]_2[\text{Cor}(p\text{-R}^1\text{Ph})_2(p\text{-R}^2\text{Ph})]$  (**1-4**) in  $\text{CH}_2\text{Cl}_2$ .

<sup>b</sup> Calculated from the main Q band of the compounds  $\text{Eu}_2[\text{Pc}(\text{OC}_4\text{H}_9)_8]_2[\text{Cor}(p\text{-R}^1\text{Ph})_2(p\text{-R}^2\text{Ph})]$  (**1-4**) in  $\text{CH}_2\text{Cl}_2$  according to  $E = hc/\lambda$ .

*tw* = this work.

**Table S3.** Characteristic Raman bands ( $\text{cm}^{-1}$ ) for  $\text{Eu}_2[\text{Pc}(\text{OC}_4\text{H}_9)_8]_2[\text{Cor}(\rho\text{-HPh})_2(\rho\text{-R}^2\text{Ph})]$  ( $\text{R}^2 = \text{CH}_3\text{O}$ , F or Cl) with excitation at 633 nm.

1	2	3	assignment
683 m	683 m	683 m	macrocycle breathing
751 m	750 m	749 m	$\delta$ macrocycle
883 w	879 w	882 w	
968 w	969 w	969 w	
1048 s	1049 w	1048 w	$\delta$ C-H
1078 s	1078 w	1073 w	
1135 m	1135 w	1128 m	pyrrole breathing
	1179 w		
1204 m	1210 m	1200 m	$\delta$ C-H
1245 m	1244 m	1241 w	
1317 m	1323 m	1314 s	$\delta$ C-H $\nu$ $\text{C}_\alpha\text{-C}_\beta$ (pyrrole)
1406 m	1408 w	1408 m	$\nu$ C=N
1429 m	1425 w	1427 w	$\nu$ C=N
1459 m	1457 w	1460 w	$\nu$ C=N
1505 sh	1507 sh	1505 sh	$\nu$ $\text{C}_\beta\text{-C}_\beta$ (pyrrole) $\nu$ C=N(aza)
1600 s	1602 s	1598 w	$\nu$ benzene

## Reference

- 1 G. Lu, J. Li, X. Jiang, Z. Ou and K. M. Kadish, *Inorg. Chem.*, 2015, **54**, 9211-9222.