## **Supporting Information**

## Substituent-tuned structure and luminescence sensitizing towards

## Al<sup>3+</sup> based on phenoxy bridged dinuclear Eu<sup>III</sup> complexes

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 Table 1
 Continuous Shape Measures calculation for EuL and EuL'

Nine-coordinate complexes, %fullout option

EP-9	1 D9h	Enneago	on						
OPY-9	2 C8v	Octagonal pyramid							
HBPY-9	3 D7h	Heptagonal bipyramid							
JTC-9	4 C3v	Johnson triangular cupola J3							
JCCU-9	5 C4v	Capped cube J8							
CCU-9	6 C4v	Spherical-relaxed capped cube							
JCSAPR-9	7 C4v	Capped square antiprism J10							
CSAPR-9	8 C4v	Spherical capped square antiprism							
JTCTPR-9	9 D3h Tricapped trigonal prism J51								
TCTPR-9	10 D3h Spherical tricapped trigonal prism								
JTDIC-9	11 C3v	11 C3v Tridiminished icosahedron J63							
HH-9	12 C2v	Hula-hoop							
MFF-9	13 Cs	Muffin							
Structure 9 CSAI	EP-9 OP PR-9 JTC	Y-9 H TPR-9	IBPY-9 TCTPI	JTC-9 R-9	JCCU-9 JTDIC-9	CCU-9 HH-9	JCSAPR- MFF-9		
ABOXIY	18.302, 23.	.921, 2	25.684,	15.971,	17.06	3, 20.7	52,		
16.350,	19.155,	13.09	6,	19.251,	21.06	8, 22.1	86,		
18.705									
ACACPT	19.197,	22.683,	27.127,	15.203,	17.881	l, 21.66	60,		
16.118,	18.897,	12.686,	18	3.744,	20.516,	21.180,	,		
18.588									

Eight-coordinate complexes, %fullout option

OP-8	1 D8h	Octag	Octagon							
HPY-8	2 C7v	Heptag	Heptagonal pyramid							
НВРҮ-8	3 D6h	Hexag	Hexagonal bipyramid							
CU-8	4 Oh	Cube								
SAPR-8	5 D4d	Square	Square antiprism							
TDD-8	6 D2c	l Triang	Triangular dodecahedron							
JGBF-8	7 D2d	Johnson gyrobifastigium J26								
JETBPY-8	8 D3h	Johnso	Johnson elongated triangular bipyramid J14							
JBTPR-8	9 C2v	Biaugm	Biaugmented trigonal prism J50							
BTPR-8	10 C2v Biaugmented trigonal prism									
JSD-8	11 D2d Snub diphenoid J84									
TT-8	12 Td Triakis tetrahedron									
ETBPY-8	13 D3h	13 D3h Elongated trigonal bipyramid								
Structure JGBF-8 ETBPY-8	OP-8 JETBPY-8	HPY-8 JBTPR-8	HBPY-4 BTI	3 PR-8	8-UC 1	SAPR-8 SD-8	TDD-8 TT-8			
ABOXIY	24.980,	14.518,	18.231,	14.78	4,	5.258,	7.570,			
19.181, 21.422	24.135,	6.97	6.976,			9.588,	15.307,			
ACACPT 18.750, 22.964	25.112, 23.123,	14.259, 7.65	19.528, 5,	15 8.043,	.596,	7.034, 9.719,	7.781, 15.993,			



Figure S1. Coordination polyhedron of Eu<sup>III</sup> ions in EuL.



Figure S2. Coordination polyhedron of  $Eu^{III}$  ions in EuL'.



Figure S3 Job's plot between EuL and Al<sup>3+</sup>.



Figure S4 ESI-MS spectra of EuL·Al.



Figure S5 LOD curves of EuL towards  $AI^{3+}$ .