Electronic Supporting Information

X-ray Crystallography

The X-ray diffraction data for **1-3** and **9-11** were collected on a Bruker AXS SMART APEX (**1**, **2**, **9**, **10**) and Oxford Xcalibur Eos (**3**, **11**) diffractometers (Mo-K_α radiation, ω-scan technique, λ = 0.71073 Å). The intensity data were integrated by SAINT (**1-2**, **10**),[1] (**9**)[2] and CrysAlisPro (**3**, **11**)[3] programs. All structures were solved by direct methods and were refined on F_{hkl}^2 using SHELXTL package (**2**),[4] (**1**, **9-11**),[5] (**3**).[6] All non-hydrogen atoms were refined anisotropically. All hydrogen atoms were placed in calculated positions and refined in the riding model. SADABS (**1-2**, **10**),[7] (**9**)[8] and SCALE3 ABSPACK (**3** and **11**)[9] were used to perform absorption corrections. The crystal of **9** contains solvate molecules of toluene, which are disordered in a common position. The details of crystallographic, collection and refinement data for **1**, **2**, **3**, **9**, **10** and **11** are presented in Table S1 and corresponding cif files are available as supporting information. CCDC 1437391 (**1**), CCDC 1437390 (**2**), CCDC 1437392 (**3**), CCDC 1437393 (**9**), CCDC 1437394 (**10**) and CCDC 1437395 (**11**) contain the supplementary crystallographic data for this paper.

Complex	**1**	**2**	**3**	**9**	**10**	**11**
Empirical formula	$C_{26}H_{26}F_{36}O_{10}Sm_2$	$C_{26}H_{26}F_{36}O_{10}Yb_2$	$C_{42}H_{22}Ce_2F_{36}N_4O_6$	$C_{43}H_{25}CeF_{24}N_4O_4$	$C_{66}H_{64}F_{84}O_{20}Sm_6$	$C_{29}H_{27}Eu_2F_{42}O_{11}Y$
Formula weight	1483.17	1528.55	1642.87	1257.79	3675.27	1742.33
Temperature [K]	100(2)	100(2)	100(2)	100(2)	100(2)	100(2)
Crystal system	Monoclinic	Monoclinic	Monoclinic	Monoclinic	Triclinic	Monoclinic
Space group	P2(1)/c	P2(1)/c	P2(1)/n	C2/c	P1	P2(1)/n
Unit cell dimensions						
a[Å]	9.5630(19)	9.7029(6)	9.54922(17)	20.3363(9)	10.7448(4)	13.17185(19)
b[Å]	17.979(4)	18.0209(10)	20.5060(3)	13.8976(6)	13.4413(5)	16.6717(2)
c[Å]	13.370(3)	13.1321(7)	13.29116(17)	32.5868(15)	19.2506(8)	23.4167(4)
α[°]	90	90	90	90	90.2290(10)	90
β[°]	106.261(4)	107.6370(10)	100.8980(14)	95.0310(10)	102.8870(10)	91.8369(14)
γ[°]	90	90	90	90	94.7970(10)	90
Volume [$Å^3$]	2206.8(8)	2188.3(2)	2555.69(7)	9174.4(7)	2699.99(18)	5139.60(13)
Z	2	2	2	8	1	4
Calculated density [Mg/m^3]	2.232	2.320	2.135	1.821	2.260	2.252
Absorption coefficient [mm^{-1}]	2.836	4.450	1.943	1.138	3.414	3.733
Crystal size [mm^3]	0.33×0.20×0.15	0.30×0.25×0.15	0.20×0.10×0.05	0.49×0.33×0.32	0.21×0.16×0.07	0.15×0.15×0.15
θ [°]	2.218 - 26.999	2.200 - 26.000	3.070 - 29.999	1.770 - 24.998	1.848 - 25.999	3.000 - 26.000
Reflections collected / unique	17588 / 4755	18172 / 4287	53354 / 7440	34787 / 8061	23376 / 20001	125864 / 10094
R(int)	0.0585	0.0348	0.0544	0.0318	0.0212	0.1210
Final R indices [I>2sigma(I)]	R_1=0.0479, wR_2=0.0920	R_1=0.0419, wR_2=0.1062	R_1=0.0320, wR_2=0.0660	R_1=0.0668, wR_2=0.1493	R_1=0.0603, wR_2=0.1527	R_1=0.0393, wR_2=0.0909
R indices (all data)	R_1=0.0672, wR_2=0.0965	R_1=0.0561, wR_2=0.1127	R_1=0.0434, wR_2=0.0694	R_1=0.0740, wR_2=0.1529	R_1=0.0820, wR_2=0.1647	R_1=0.0485, wR_2=0.0953
S	1.031	1.055	1.052	1.038	1.044	1.037
Largest diff. peak and hole [$e/Å^3$]	1.236/-1.379	2.046/-1.792	0.877/-0.957	1.442/-0.914	1.920/-1.147	1.609/-1.349

Table S1. Details of crystallographic, collection and refinement data for **1-3**, **9-11**.

References

1. SAINTPlus Data Reduction and Correction Program, v. 6.45a; Bruker AXS: Madison, WI, 2003.
2. SAINT. Data Reduction and Correction Program. v. 8.27B. Bruker AXS Inc., Madison, Wisconsin, USA, 2012.
3. Data Collection. Reduction and Correction Program. CrysalisPro – Software Package Agilent Technologies, 2012.
4. G.M. Sheldrick, SHELXTL, v. 6.12 Structure Determination Software Suite; Bruker AXS: Madison, WI, 2000.
5. G.M. Sheldrick, SHELXTL, v. 6.14 Structure Determination Software Suite; Bruker AXS: Madison, WI, 2000.
6. G.M. Sheldrick, SHELXTL, v. 2013-4 Structure Determination Software Suite; Bruker AXS: Madison, WI, 2000.
7. Sheldrick G.M. SADABS-2012/1. Bruker/Siemens Area Detector Absorption Correction Program. Bruker AXS Inc., Madison, Wisconsin, USA, 2012.
8. SADABS. Bruker/Siemens Area Detector Absorption Correction Program, v.2014/2, Bruker AXS, Madison, Wisconsin, USA.
9. SCALE3 ABSPACK: Empirical absorption correction, CrysAlis Pro - Software Package, Agilent Technologies (2012).