

1 Supplementary Figures

1.1 Low Temperature Luminescence Spectra

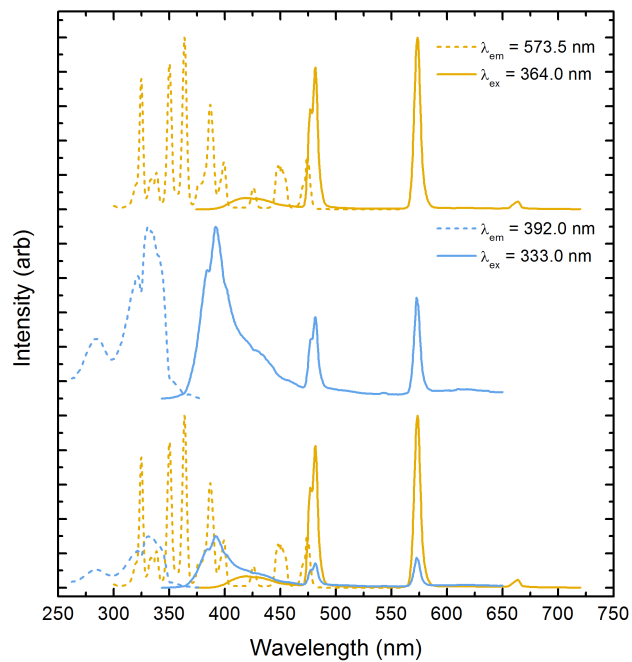


Figure S1: Luminescence at spectra of **DyAu** at 77 K.

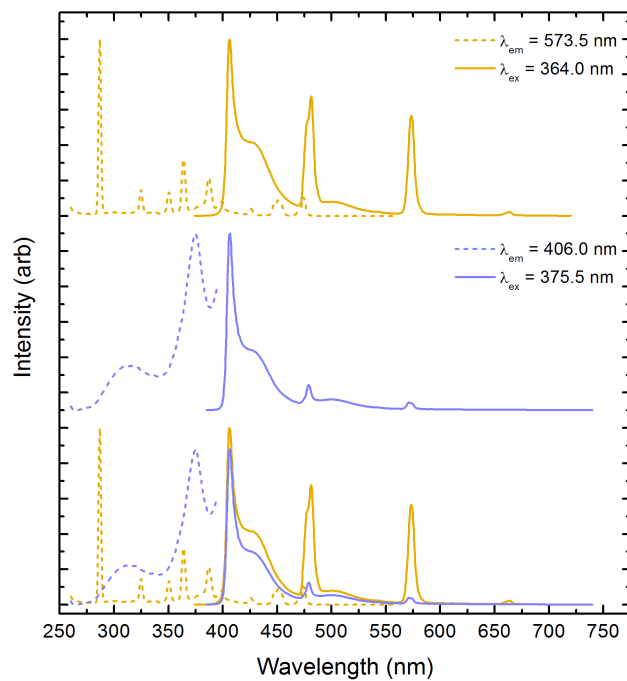


Figure S2: Luminescence at spectra of **CeDyAu** at 77 K.

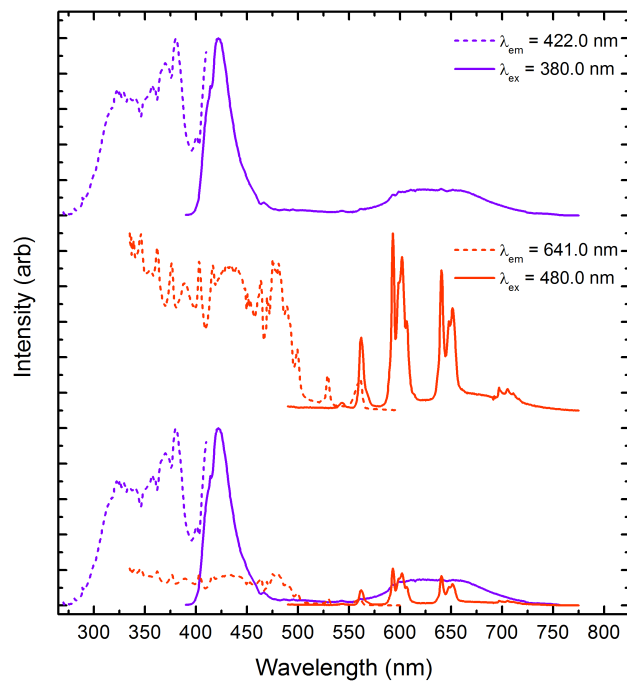


Figure S3: Luminescence at spectra of **SmAu** at 77 K.

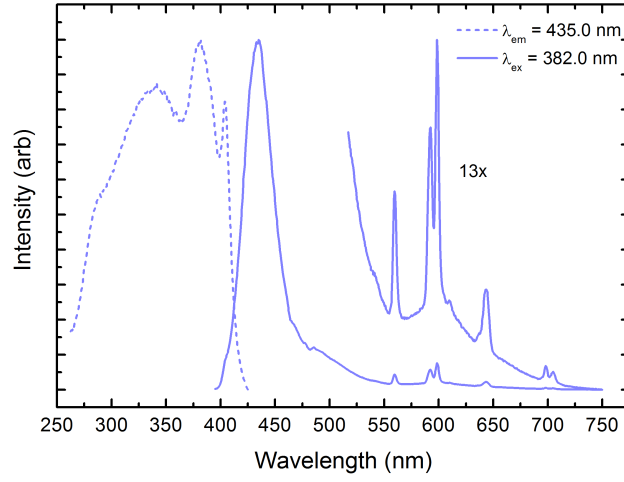


Figure S4: Luminescence spectra of **SmAu₃** at 77 K.

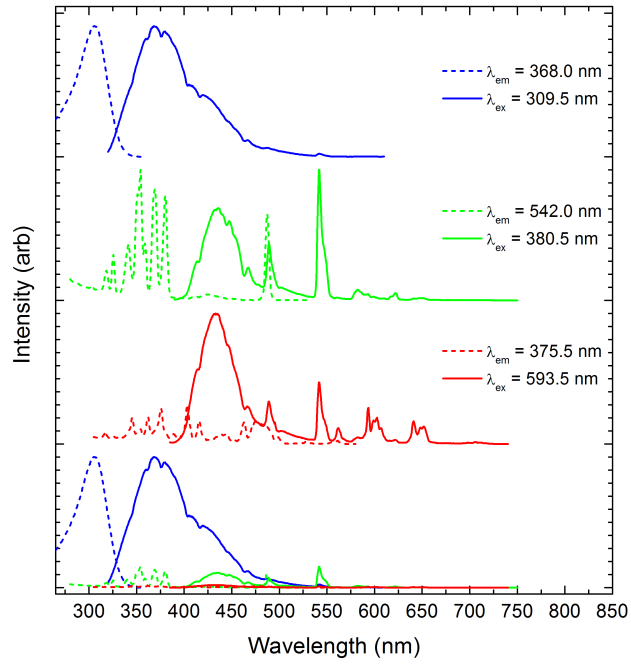


Figure S5: Luminescence spectra of **SmTbAu** at 77 K.

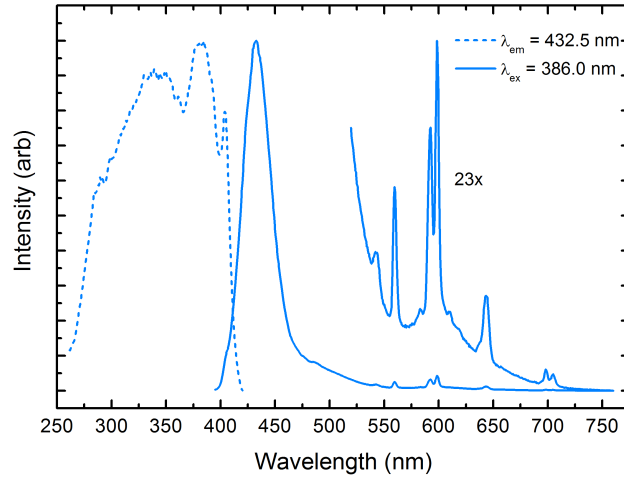


Figure S6: Luminescence spectra of **SmTbAu₃** at 77 K.

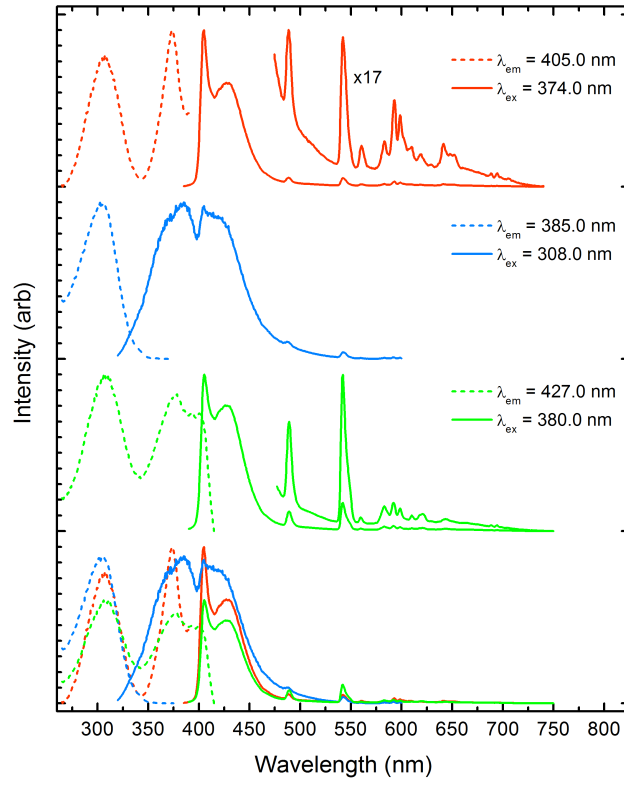


Figure S7: Luminescence spectra of **CeSmTbAu** at 77 K.

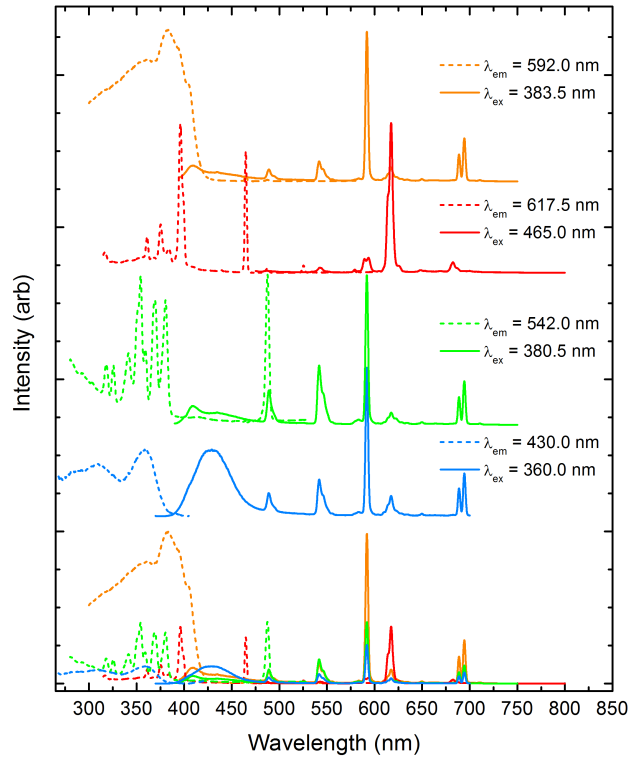


Figure S8: Luminescence at spectra of **CeEuTbAu** at 77 K.

2 Supplementary Tables

Table S1: Crystallographic data for **DyAu**, **SmAu**, and **SmAu₃**

	DyAu	SmAu	SmAu₃
Empirical formula	C ₃₄ H ₇₂ AuDyN ₈ O ₁₂	C ₃₄ H ₇₂ AuN ₈ O ₁₂ Sm	C ₆ H ₆ Au ₃ N ₆ O ₃ Sm
Formula weight (g·mol ⁻¹)	1144.47	1132.33	951.41
Crystal System	Orthorhombic	Orthorhombic	Hexagonal
Space Group	<i>I</i> 2 ₁ 2 ₁ 2 ₁	<i>I</i> 2 ₁ 2 ₁ 2 ₁	<i>P</i> 6 ₃ / <i>mcm</i>
<i>a</i> (Å)	11.9599(5)	12.0374(5)	6.6365(2)
<i>b</i> (Å)	12.0540(5)	12.0321(5)	6.6365(2)
<i>c</i> (Å)	34.8906(14)	35.0346(14)	18.3078(5)
α (°)	90	90	90
β (°)	90	90	90
γ (°)	90	90	120
<i>V</i> (Å ³)	5030.0(4)	5074.2(4)	698.30(5)
<i>Z</i>	4	4	2
<i>T</i> (K)	296(2)	296(2)	299(2)
ρ_{calcd} (g·cm ⁻³)	1.511	1.482	4.496
μ (mm ⁻¹)	4.444	4.090	35.567
<i>R</i> , <i>R_w</i> [<i>I</i> ₀ ≥ 2σ (<i>I</i> ₀)]	0.0364, 0.0968	0.0243, 0.0547	0.0315, 0.0574
Goodness of fit	0.937	1.132	0.939
Reflections [<i>I</i> ₀ ≥ 2σ (<i>I</i> ₀)]	6251	5084	271

Table S2: Summary of Luminescence Experimental Parameters and Corresponding CIE Coordinates

Compound	T (K)	$\lambda_{em}, [\lambda_{ex}]$ (nm)	CIE (x, y)
DyAu	298	572.5 [364.0]	0.33, 0.39
		373.0 [322.0]	0.29, 0.32
	77	573.5 [364.0]	0.31, 0.33
		392.0 [333.0]	0.27, 0.22
CeDyAu	298	572.5 [451.0]	0.33, 0.40
		397.5 [322.0]	0.22, 0.21
	77	573.5 [364.0]	0.21, 0.17
		406.0 [375.5]	0.17, 0.09
		[410.0]	0.16, 0.15
SmAu	298	397.0 [362.0]	0.47, 0.31
		642.0 [404.0]	0.35, 0.18
	77	422.0 [380.0]	0.28, 0.12
		641.0 [480.0]	0.59, 0.40
SmAu₃	298	404.0 [370.0]	0.21, 0.11
	77	435.0 [382.0]	0.18, 0.06
SmTbAu₃	298	406.0 [375.0]	0.21, 0.15
	77	432.5 [386.0]	0.17, 0.05
CeEuTbAu	298	617.0 [464.5]	0.65, 0.35
		[384.0]	0.38, 0.41
		542.0 [380.5]	0.34, 0.49
		372.0 [322.0]	0.18, 0.11
		440.0 [312.0]	0.17, 0.10
	77	592.0 [383.5]	0.39, 0.31
		617.5 [465.0]	0.63, 0.36
		542.0 [380.5]	0.35, 0.34
		430.0 [360.0]	0.26, 0.16
		369.5 [312.0]	0.16, 0.05
SmTbAu	298	542.0 [353.5]	0.21, 0.26
		[375.5]	0.31, 0.28
		593.5 [403.5]	0.42, 0.29
		368.0 [309.5]	0.16, 0.05
	77	542.0 [380.5]	0.19, 0.16
		593.5 [375.5]	0.21, 0.12
		398.5 [310.0]	0.16, 0.06
		398.5 [370.0]	0.23, 0.24
CeSmTbAu	298	542.0 [380.0]	0.23, 0.23
		591.5 [403.5]	0.46, 0.33
		405.0 [374.5]	0.18, 0.05
		385.0 [308.0]	0.16, 0.06
	77	427.0 [380.0]	0.18, 0.07