

# Effect of the Composition of Lanthanide Complexes on Their Luminescence Enhancement by Ag@SiO<sub>2</sub> Core-Shell Nanoparticles

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## 1. UV-vis absorption data of ligands and complexes

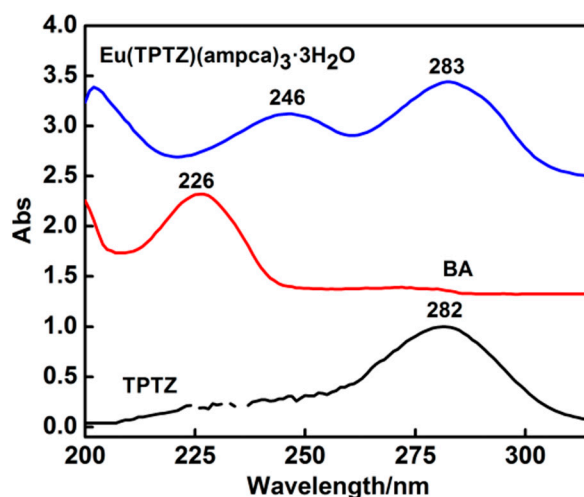
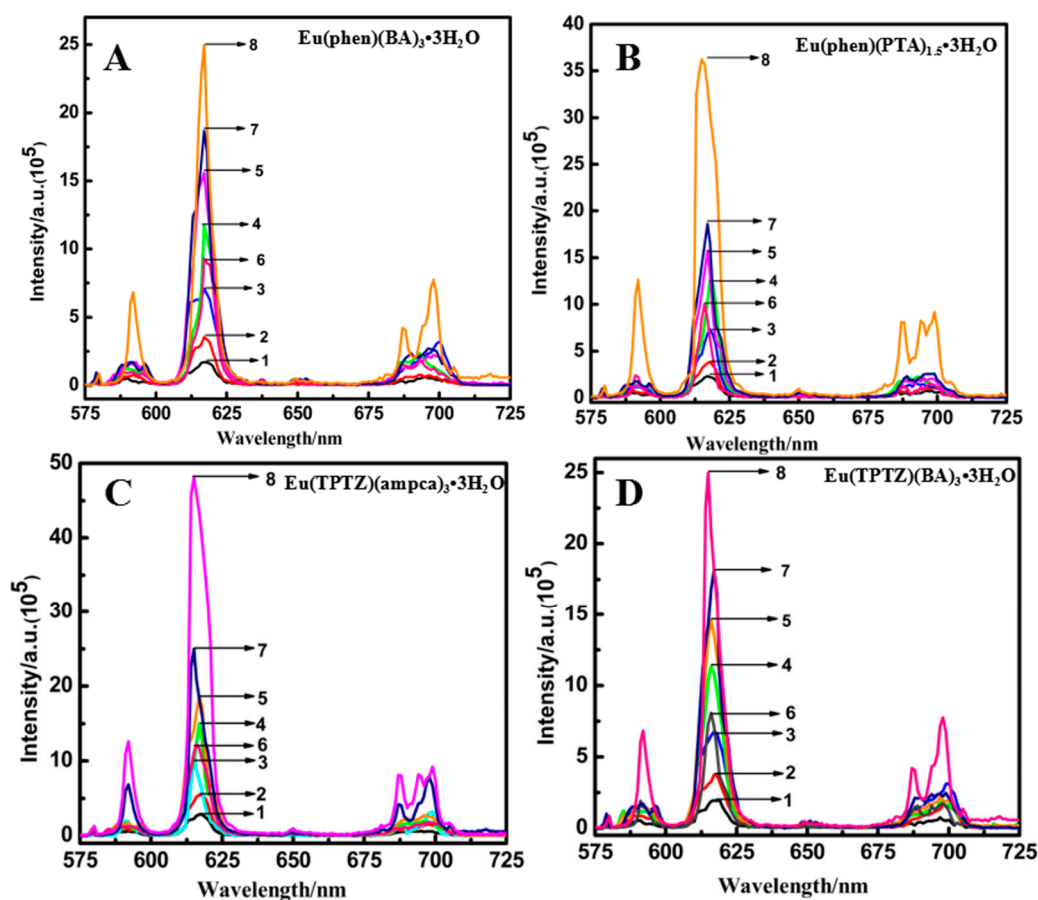


Fig S1. UV-vis absorption spectra of Eu(TPTZ)(BA)<sub>3</sub>·3H<sub>2</sub>O and ligands.

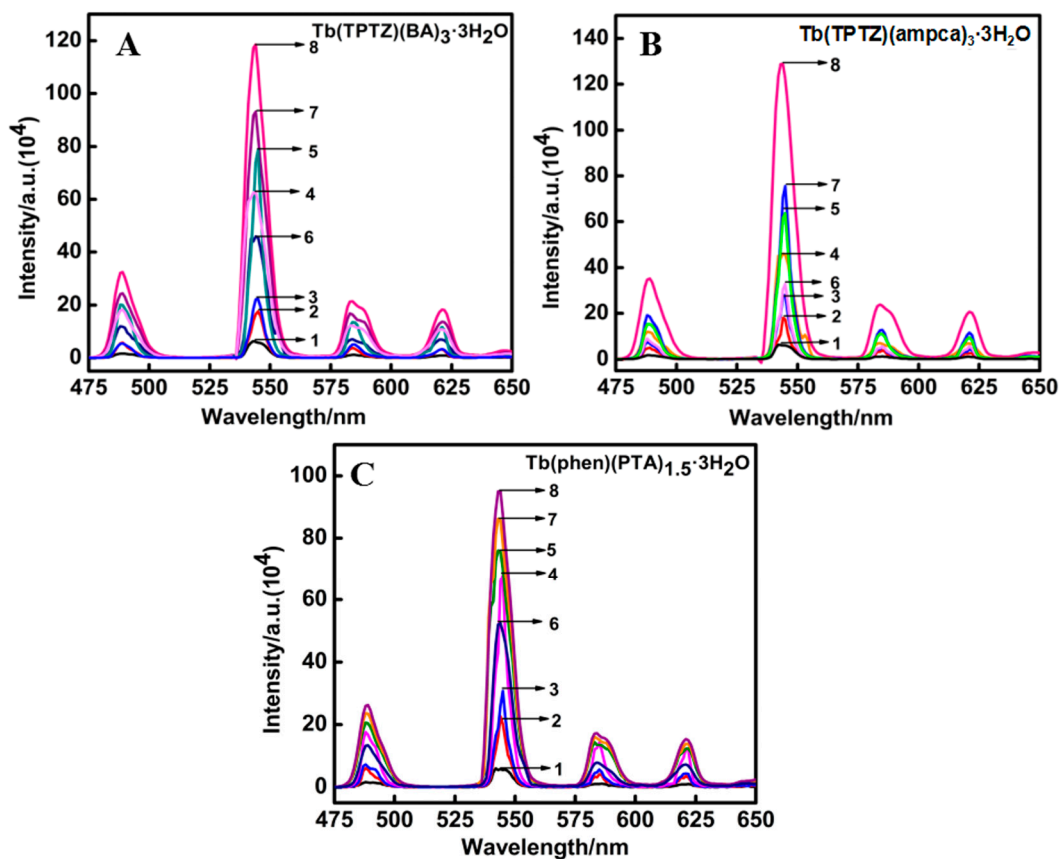
Table S1. UV-vis absorption peak positions of complexes and ligands.

Ligands and complexes	Peak position (nm)
TPTZ	282
BA	226
phen	263
PTA	239
ampca	350
Eu(phen)(ampca) <sub>3</sub> ·3H <sub>2</sub> O	356
Eu(TPTZ)(BA) <sub>3</sub> ·3H <sub>2</sub> O	283
Eu(TPTZ)(ampca) <sub>3</sub> ·3H <sub>2</sub> O	364
Eu(phen)(BA) <sub>3</sub> ·3H <sub>2</sub> O	289
Eu(phen)(PTA) <sub>1.5</sub> ·3H <sub>2</sub> O	264

## 2. Luminescence emission spectra of the complexes

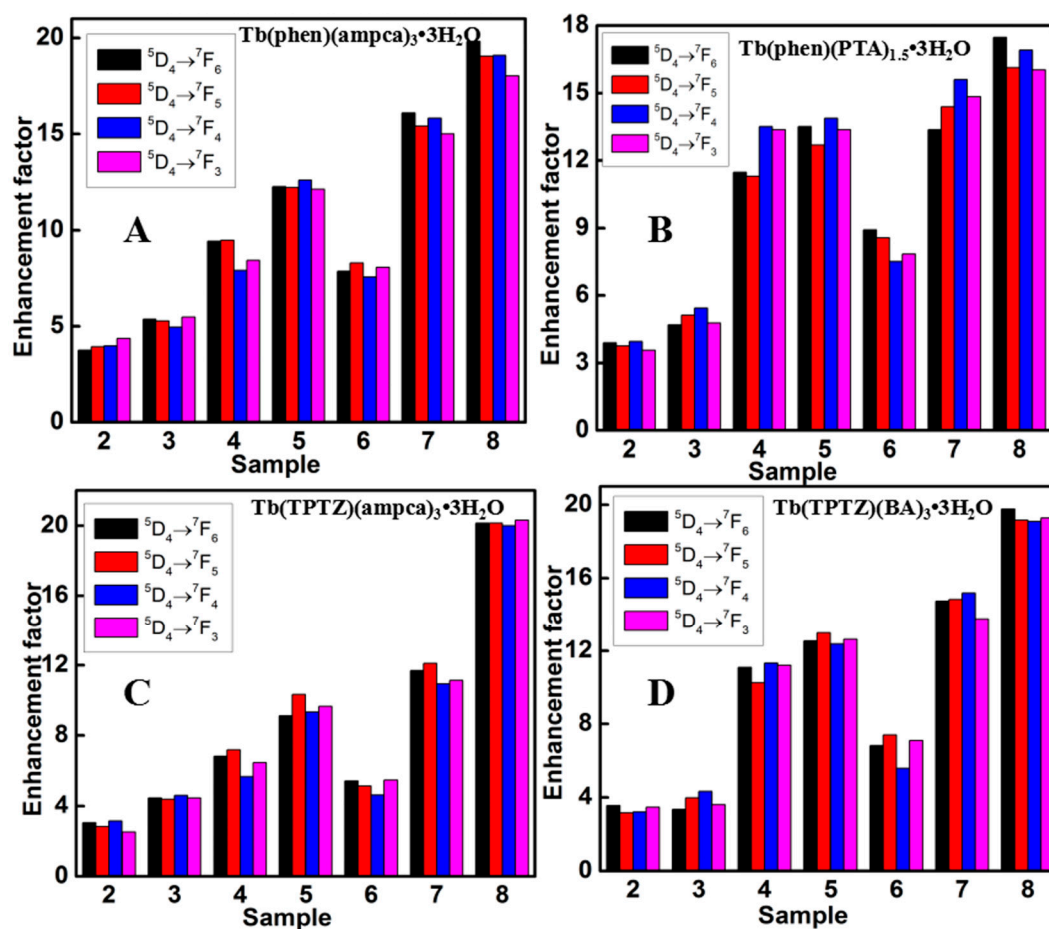


**Fig S2.** Luminescence emission spectra of Eu complexes with Ag@SiO<sub>2</sub> nanoparticles. (A) Eu(phen)(BA)<sub>3</sub>·3H<sub>2</sub>O; (B) Eu(phen)(PTA)<sub>1.5</sub>·3H<sub>2</sub>O; (C) Eu(TPTZ)(ampca)<sub>3</sub>·3H<sub>2</sub>O; (D) Eu(TPTZ)(BA)<sub>3</sub>·3H<sub>2</sub>O. Sample 1 is the pure complex. 2~5 represent the complex added with the Ag@SiO<sub>2</sub> nanoparticles with core size of 80–100 nm and shell thickness of 5, 12, 20, 30 nm. 6~8 represent the complex added with the Ag@SiO<sub>2</sub> nanoparticles with core size of 40–60 nm and shell thickness of 12, 30 and 40 nm, respectively.

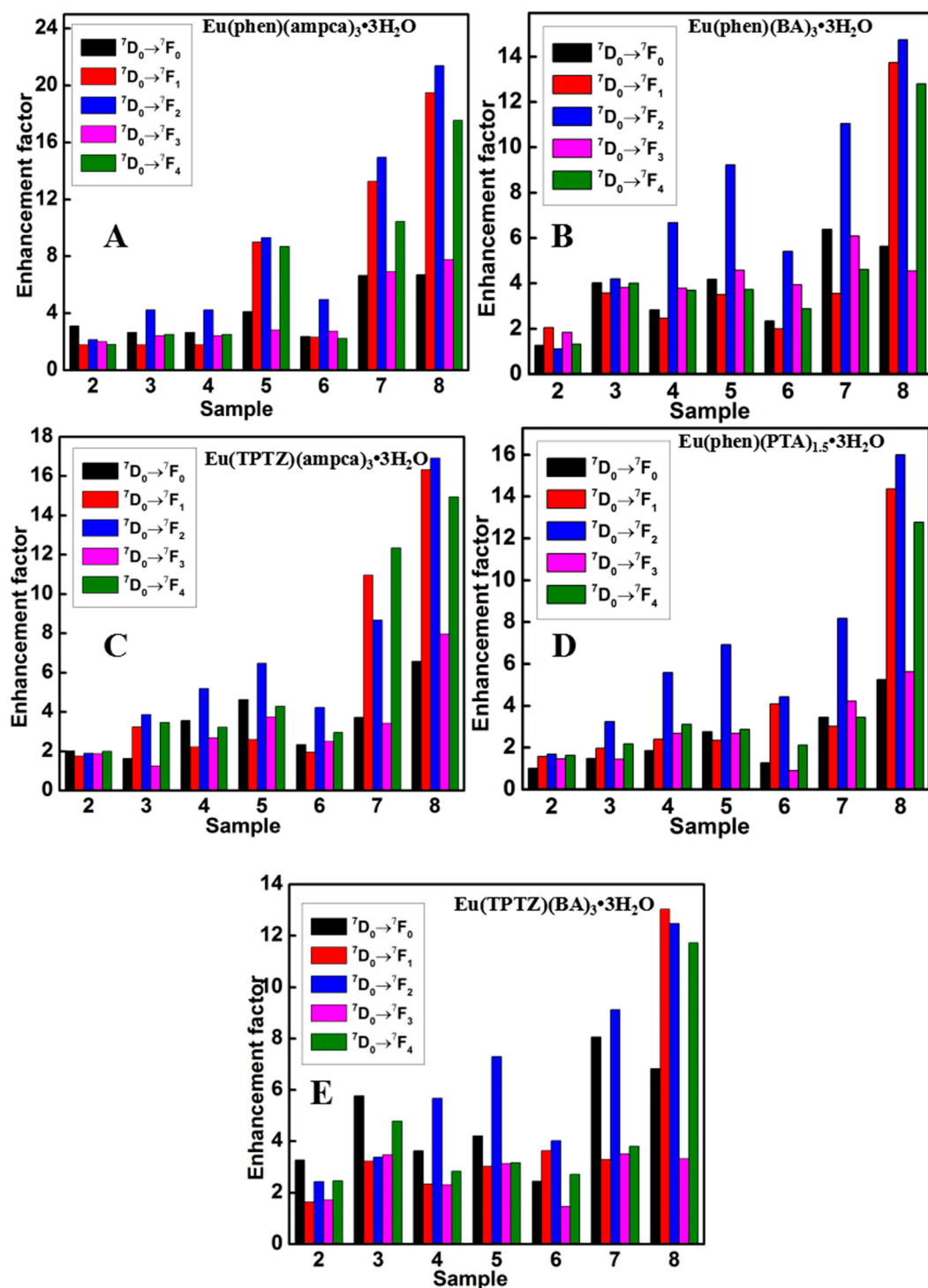


**Fig S3.** Luminescence emission spectra of Tb complexes with Ag@SiO<sub>2</sub> nanoparticles. (A) Tb(TPTZ)(BA)<sub>3</sub>·3H<sub>2</sub>O; (B) Tb(TPTZ)(ampca)<sub>3</sub>·3H<sub>2</sub>O; (C) Tb(phen)(PTA)<sub>1.5</sub>·3H<sub>2</sub>O. Sample 1 is the pure complex. 2~5 represent the complex added with the Ag@SiO<sub>2</sub> nanoparticles with core size of 80–100 nm and shell thickness of 5, 12, 20, 30 nm. 6~8 represent the complex added with the Ag@SiO<sub>2</sub> nanoparticles with core size of 40–60 nm and shell thickness of 12, 30 and 40 nm, respectively.

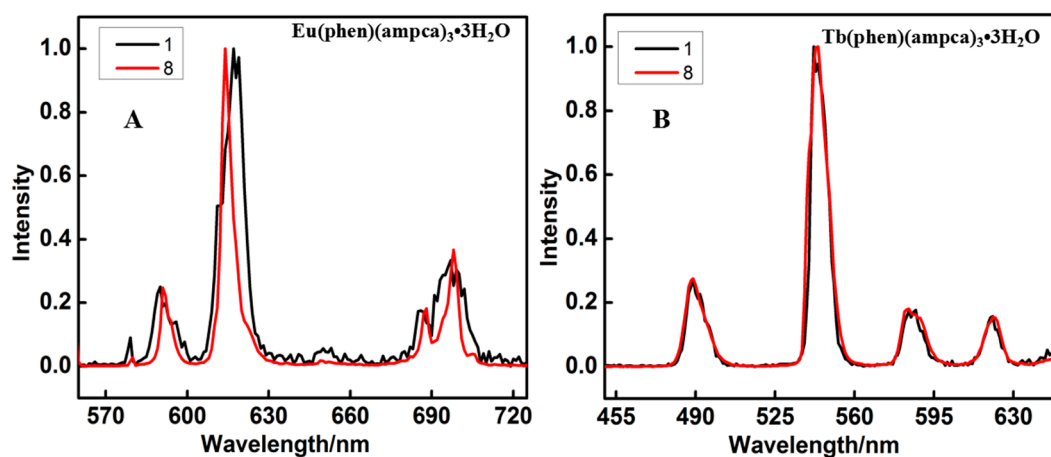
### 3. Luminescent Enhancement factor of the complexes



**Fig S4.** Luminescence enhancement factor of Tb complexes with Ag@SiO<sub>2</sub> nanoparticles. (A) Tb(phen)(ampca)<sub>3</sub>•3H<sub>2</sub>O; (B) Tb(phen)(PTA)<sub>1.5</sub>•3H<sub>2</sub>O; (C) Tb(TPTZ)(ampca)<sub>3</sub>•3H<sub>2</sub>O; (D) Tb(TPTZ)(BA)<sub>3</sub>•3H<sub>2</sub>O. Samples 2~5 represent the complex added with the Ag@SiO<sub>2</sub> nanoparticles with core size of 80–100 nm and shell thickness of 5, 12, 20, 30 nm. 6~8 represent the complex added with the Ag@SiO<sub>2</sub> nanoparticles with core size of 40–60 nm and shell thickness of 12, 30 and 40 nm, respectively.



**Fig S5.** Luminescence enhancement factor of Eu complexes with Ag@SiO<sub>2</sub> nanoparticles. (A) Eu(phen)(ampca)<sub>3</sub>·3H<sub>2</sub>O; (B) Eu(phen)(BA)<sub>3</sub>·3H<sub>2</sub>O; (C) Eu(TPTZ)(ampca)<sub>3</sub>·3H<sub>2</sub>O; (D) Eu(phen)(PTA)<sub>1.5</sub>·3H<sub>2</sub>O; (E) Eu(TPTZ)(BA)<sub>3</sub>·3H<sub>2</sub>O. Samples 2~5 represent the complex added with the Ag@SiO<sub>2</sub> nanoparticles with core size of 80–100 nm and shell thickness of 5, 12, 20, 30 nm. 6~8 represent the complex added with the Ag@SiO<sub>2</sub> nanoparticles with core size of 40–60 nm and shell thickness of 12, 30 and 40 nm, respectively.



**Fig S6.** Normalized luminescent emission spectra of Eu(phen)(ampca)<sub>3</sub>·3H<sub>2</sub>O (**A**) and Tb(phen)(ampca)<sub>3</sub>·3H<sub>2</sub>O (**B**) before (sample 1) and after (sample 8) the addition of Ag@SiO<sub>2</sub> nanoparticles with core size of 40–60 nm and shell thickness of 40 nm.