Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.
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SUPPLEMENTARY INFORMATION

A Novel Visible and Near-infrared Luminescent Monolayer Thin Film based on Postsynthetic Method and Functional Linker

Ye Lu and Bing Yan*

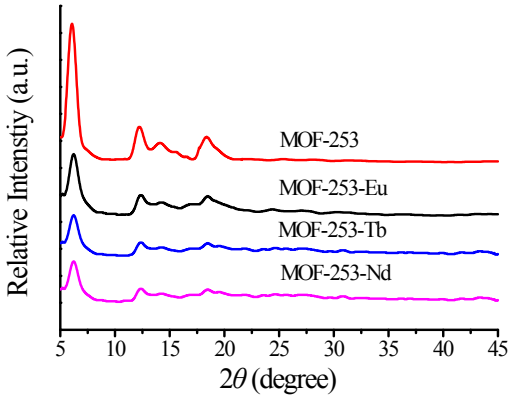

Figure S1 Powder x-ray diffraction patterns for MOF-253, MOF-253-Eu, MOF-253-Tb and MOF-253-Yb, the PXRD of MOF-253 is consistent with reported literature.[S2]

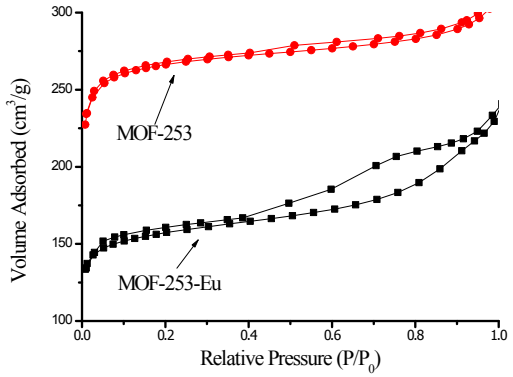

Figure S2 N_2 adsorption-desorption isotherms of MOF-253 and MOF-253-Eu, the Langmuir surface areas of MOF-253 and MOF-253-Eu were calculated to be 1156, and 341 m^2/g, the Langmuir surface of MOF-253 is consistent with reported literature. [S3]

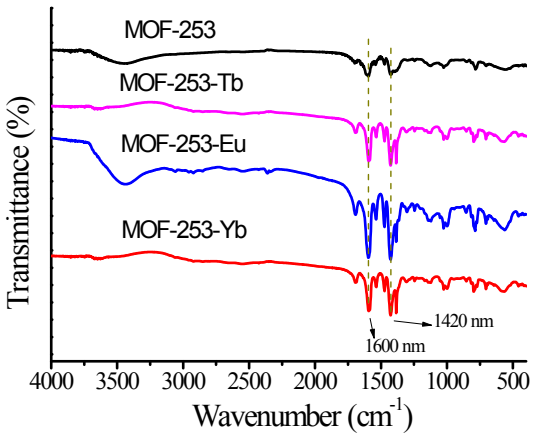

Figure S3 FT-IR spectra of MOF-253, MOF-253-Tb, MOF-253-Eu and MOF-253-Yb.

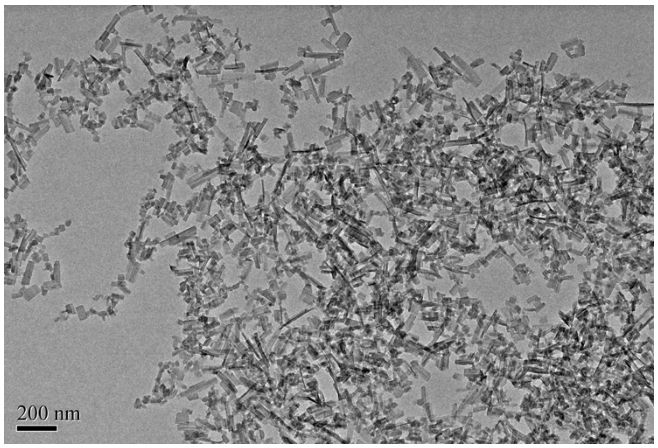

Figure S4 TEM image of MOF-253.

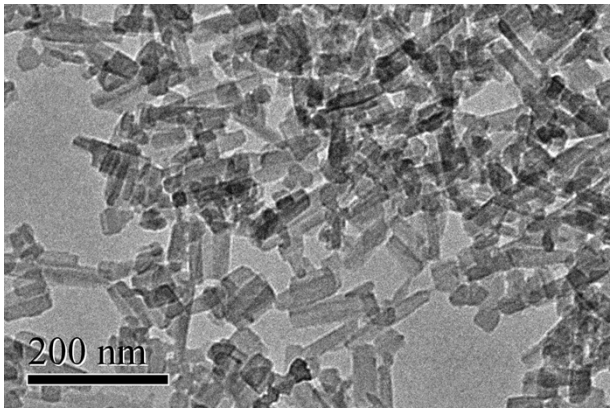

Figure S5 TEM image of MOF-253-Eu.

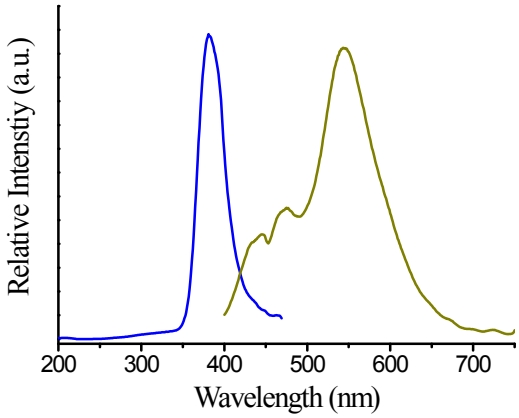

Figure S6 The excitation (blue) and PL spectra (yellow) of MOF-253 (λ_{em} = 550 nm and λ_{ex} = 380 nm).

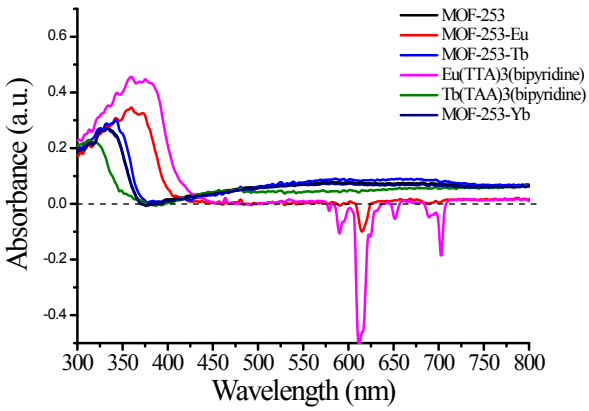

Figure S7 UV-visible diffuse reflectance spectra (DRS) of MOF-253-based luminescent material and lanthanide complex.

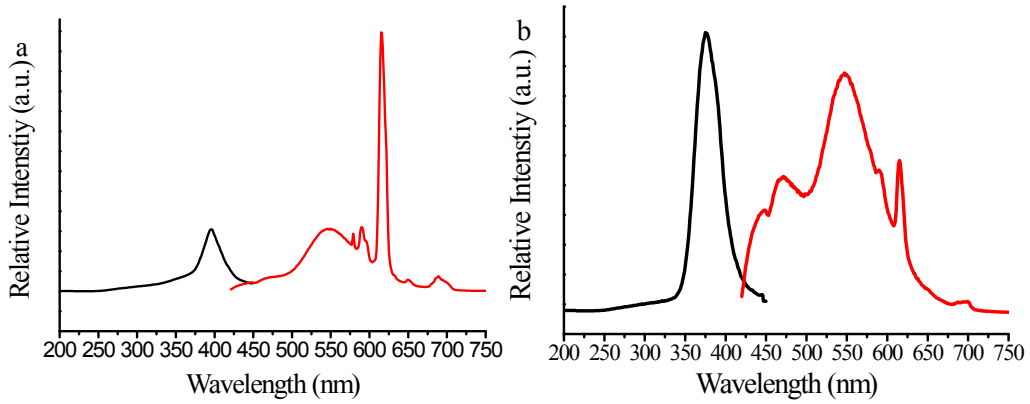

Figure S8 The luminescent spectra of MOF-253-Eu (a) and MOF-253 with Eu^{3+} ion (b) (λ_{em} = 550 nm and λ_{ex} = 380 nm).

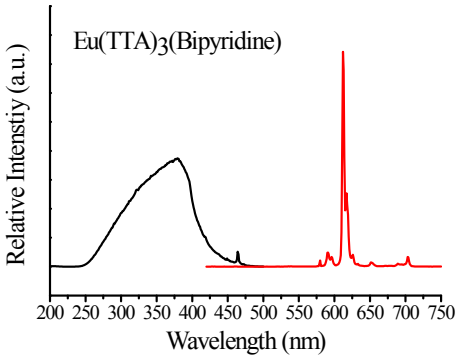

Figure S9 The luminescent spectra of $Eu(TTA)_3$(bipyridine) (λ_{em} = 614 nm and λ_{ex} = 380 nm).

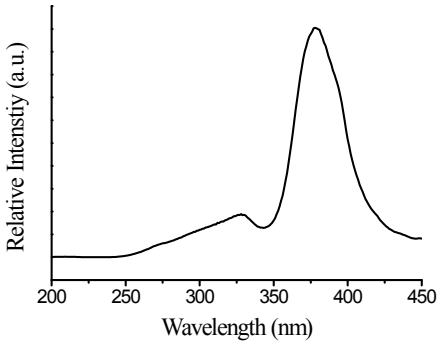

Figure S10 The excitation spectrum of MOF-253-Tb (λ_{em} = 545 nm).

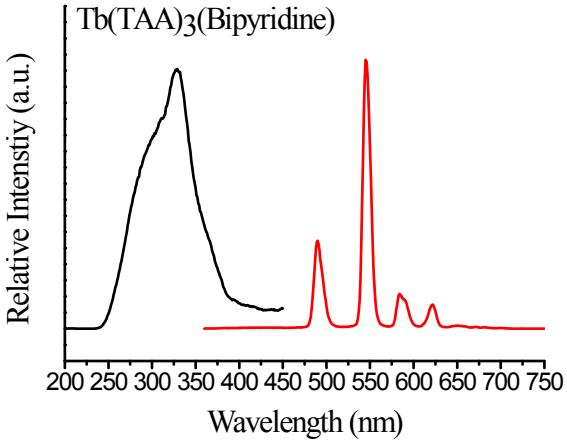

Figure S11 The luminescent spectra of $Tb(TAA)_3$(bipyridine) (λ_{em} = 545 nm and λ_{ex} = 330 nm).

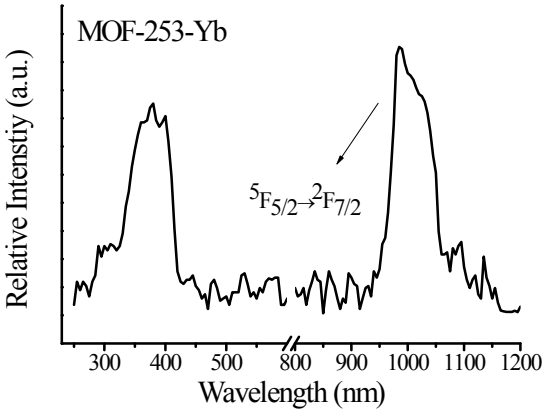

Figure S12 The luminescent spectra of MOF-253-Yb (λ_{em} = 980 nm and λ_{ex} = 378 nm).

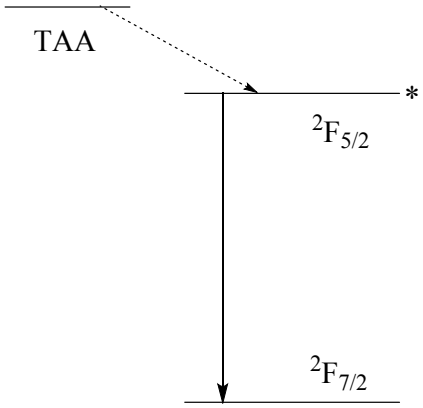

Figure S13 Schematic energy level diagrams of the sensitization of TAA to Yb^{3+} ion.

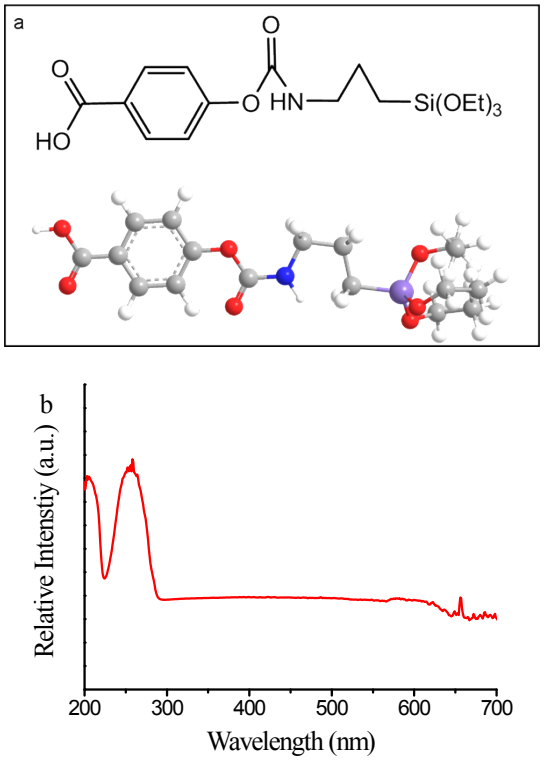

Figure S14 (a) Molecule structure of linker 1 HBA-TEPIC (HBA = 1,4-hydroxybenzoic acid, TEPIC= 3- (triethoxysilyl)-propyl-isocynate); (b) the UV-visible absorbance spectrum of HBA-TEPIC, recorded in ethanol solution.

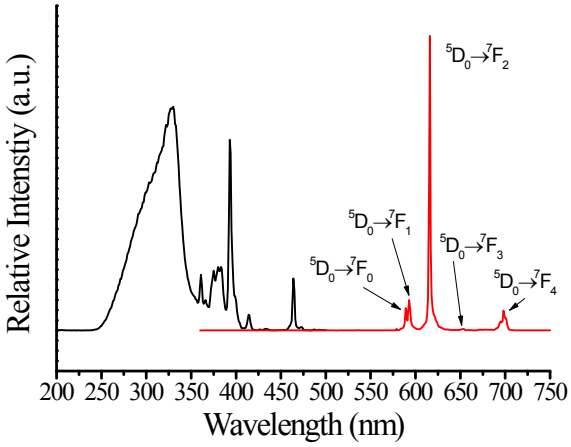

Figure S15 The luminescent spectra of 1-(Eu^{3+})quartz (λ_{em} = 616 nm and λ_{ex} = 330 nm).

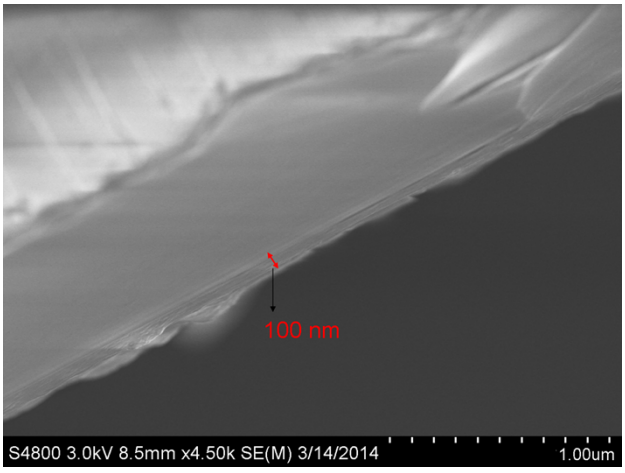

Figure S16 SEM images of MOF-1(Eu^{3+})quartz thin film viewed from cross-section.

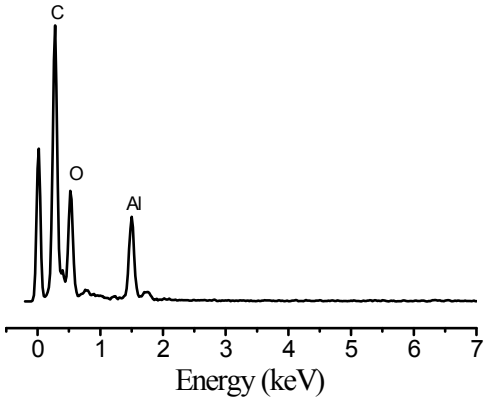

Figure S17 EDS of MOF-1(Eu^{3+})quartz thin film from cross-section.

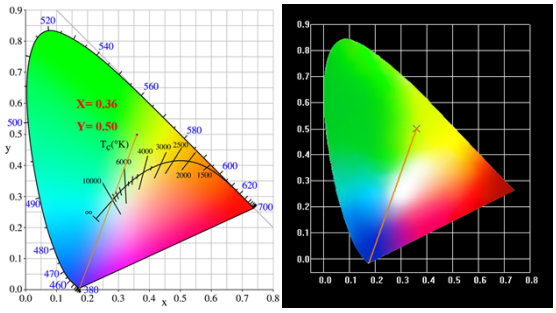

Figure S18 The CIE plot of MOF-253

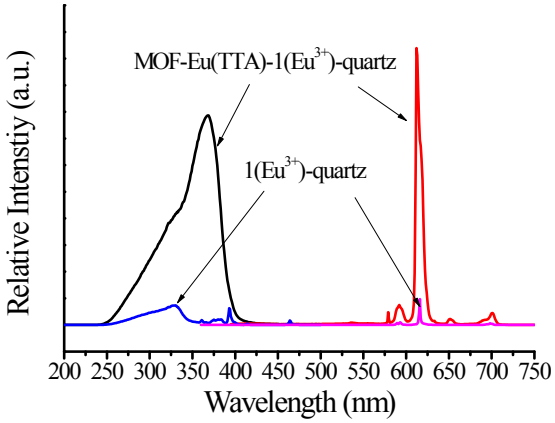

Figure S19 The excitation (blue) and emission spectra (pink) of 1-(Eu^{3+})quartz (excited and monitored at 328 nm and 616 nm, respectively); the excitation (black) and emission spectra (red) of MOF-Eu(TTA)-1-(Eu^{3+})quartz (excited and monitored at 368 nm and 612 nm, respectively)

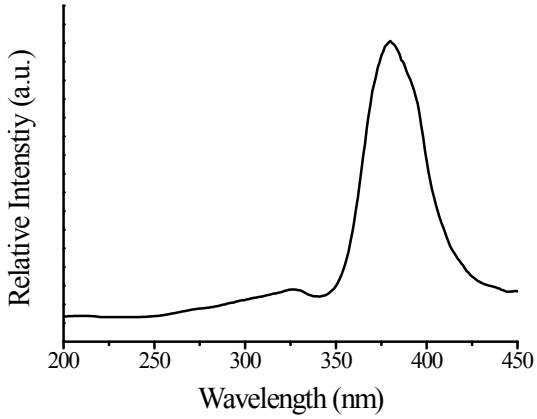

Figure S20 The excitation spectrum of MOF-Tb(TAA)-1-(Tb^{3+})quartz (λ_{em} = 545 nm).

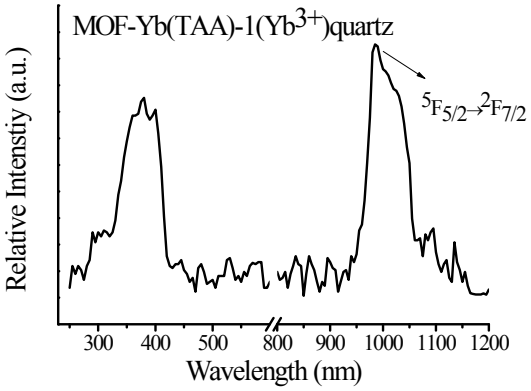

Figure S21 The luminescent spectra of MOF-Yb(TAA)-1(Yb^{3+})quartz, excited and monitored at 380 and 984 nm, respectively

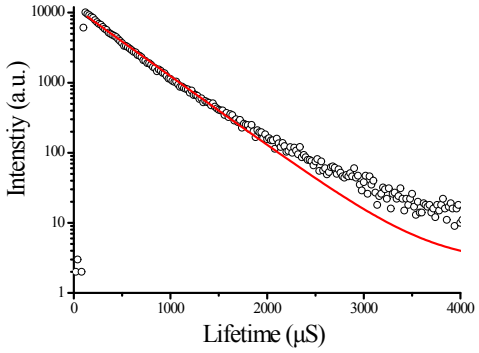

Figure S22 Decay curve of MOF-Eu(TTA)-1(Eu^{3+})-quartz.

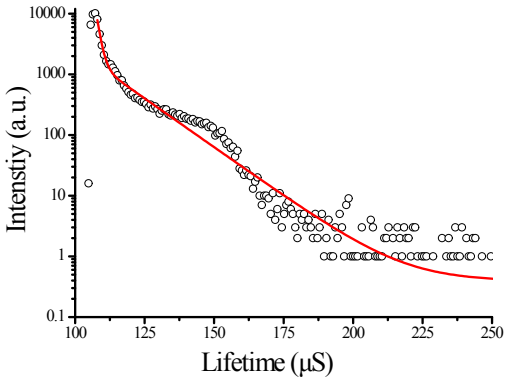

Figure S23 Decay curve of MOF-Tb(TAA)-1(Tb^{3+})-quartz.

References:

S1 X. F. Qiao, B. Yan, *Dalton Trans.*, 2009, 8509.

S2 E. D. Bloch, D. Britt, C. Lee, C. J. Doonan, F. J. Uribe-Romo, H. Furukawa, J. R. Long, O. M. Yaghi, *J. Am. Chem. Soc.*, 2010, **132**, 14382.

S3 F. Carson, S. Agrawal, M. Gustafsson, A. Bartoszewicz, F. Moraga, X. D. Zou, B. Martin-Matute, *Chem-Eur. J.*, 2012, **18**, 15337.