Self-assembled hierarchical architecture of tetragonal $AgLa(MoO_4)_2$ crystal: hydrothermal synthesis, morphology evolution and luminescence property

Wenpeng Xia[a], Yufeng Zhang[a], Shanshan Hu[a,*], Jie Xiong[a], Jianfeng Tang[b] and Jun Yang[a,*]

[a] *School of Chemistry and Chemical Engineering, Southwest University, Chongqing, 400715, China.*
[b] *Faculty of Materials and Energy, Southwest University, Chongqing, 400715, China.*

Table S1 The lattice parameters and cell volume of $AgLa(MoO_4)_2:Ln^{3+}$ samples.

Sample $AgLa(MoO_4)_2:Ln^{3+}$	Lattice parameter(a,b,c)/ Å (α, β, γ) /°	Cell volume V/ Å	Crystal system
$AgLa(MoO_4)_2$	a=b=5.3762, c=11.8362 α= β= γ=90°	V=342.11	Tetragonal
$AgLa(MoO_4)_2$:3%Sm	a=b=5.3633, c=11.7903 α= β= γ=90°	V=339.15	Tetragonal
$AgLa(MoO_4)_2$:10%Eu	a=b=5.35964, c=11.7845 α= β= γ=90°	V=338.49	Tetragonal
$AgLa(MoO_4)_2$:7%Tb	a=b=5.3502, c=11.7708 α= β= γ=90°	V=336.93	Tetragonal
$AgLa(MoO_4)_2$:5%Dy	a=b=5.3445, c=11.7411 α= β= γ=90°	V=334.74	Tetragonal
$AgLa(MoO_4)_2$:10%Yb,1%Er	a=b=5.3359, c=11.7190 α= β= γ=90°	V=333.66	Tetragonal
$AgLa(MoO_4)_2$:20%Yb,1%Tm	a=b=5.3196, c=11.6905 α= β= γ=90°	V=330.82	Tetragonal
$AgLa(MoO_4)_2$:20%Yb,1%Ho	a=b=5.3014, c=11.6775 α= β= γ=90°	V=328.19	Tetragonal

Table S2 The full width at half maximum (FWHM) and crystallite size of $AgLa(MoO_4)_2$ prepared at different pH values.

Sample	pH value	Full width at half maximum(FWHM)	Crystallite size (nm)
$AgLa(MoO_4)_2$	2	0.239	37.7
$AgLa(MoO_4)_2$	3	0.257	34.6
$AgLa(MoO_4)_2$	4	0.338	25.4
$AgLa(MoO_4)_2$	6	0.386	22.0
$AgLa(MoO_4)_2$	8	0.441	19.1

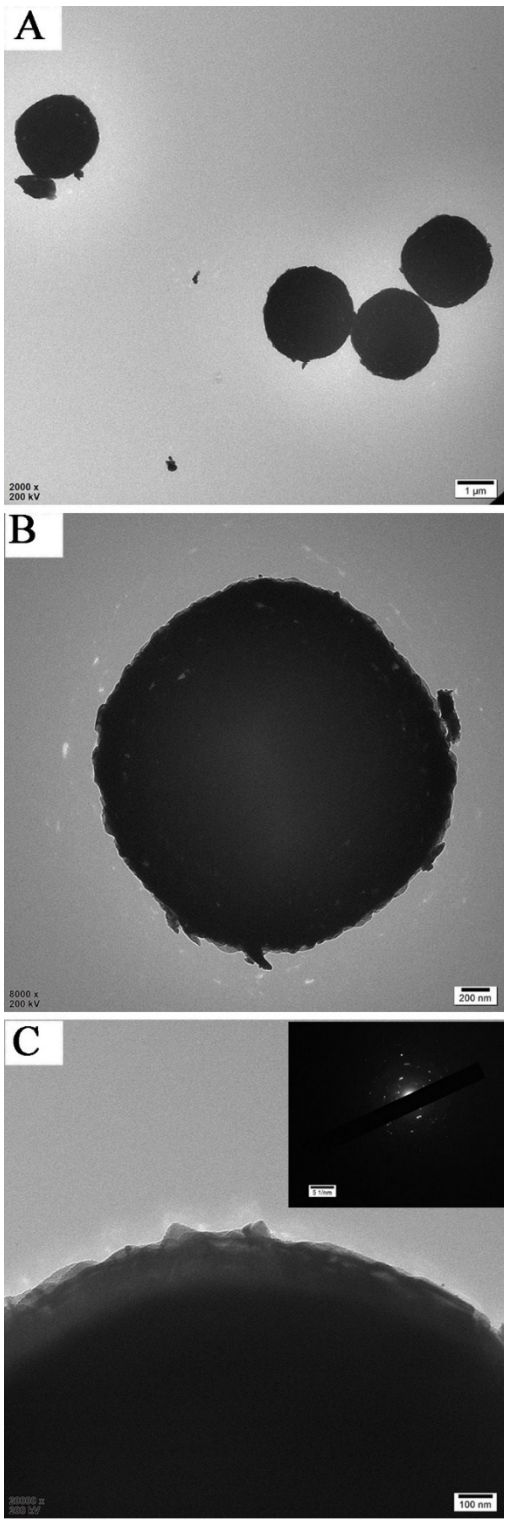

Fig. S1 TEM images and SAED patterns of disc-like $AgLa(MoO_4)_2$ microcrystals. (A) Representative TEM image of the as-prepared microplates with the molar retios of Mo/La=2, (B) TEM iamge of an individual $AgLa(MoO_4)_2$ microplate, (C) TEM imageand SAED result of the fringe of an individual microplate.

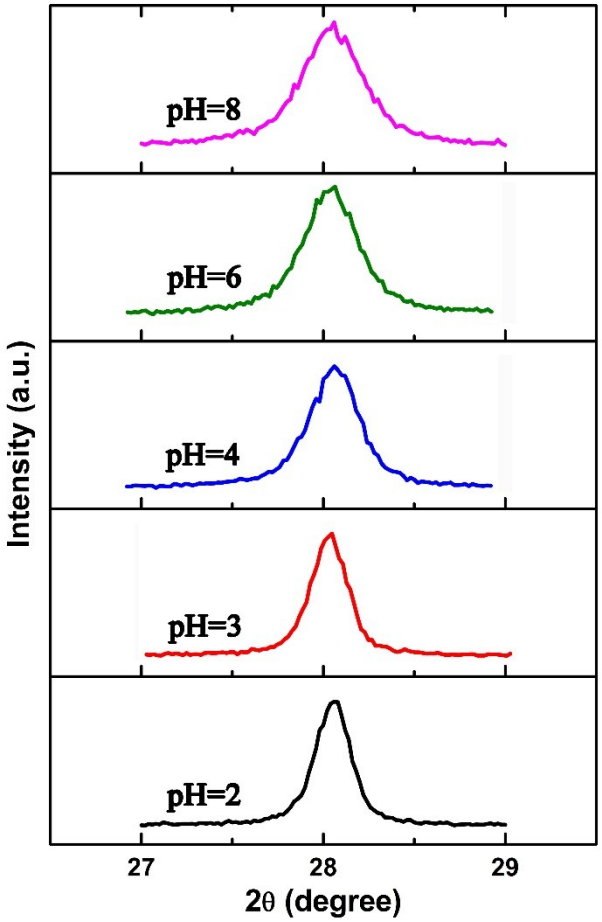

Fig. S2 Enlarged XRD patterns of the $AgLa(MoO_4)_2$ (112) peak at different pH values.

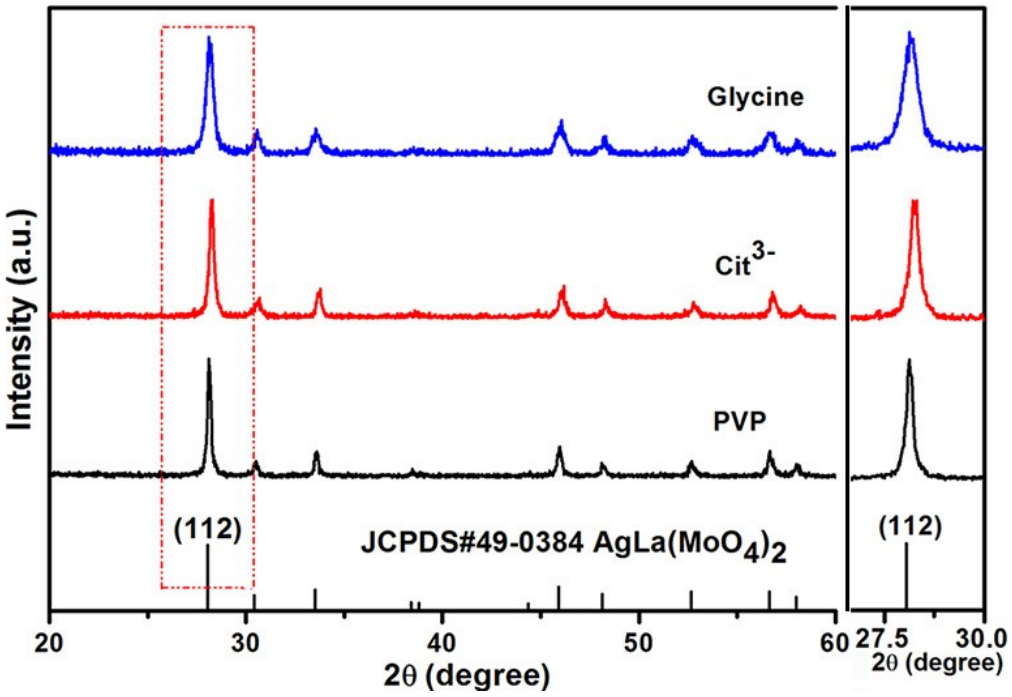

Fig. S3 XRD patterns and enlarged (112) peak images of $AgLa(MoO_4)_2$ crystals prepared with PVP, Cit^{3-} and Glycine, respectively.

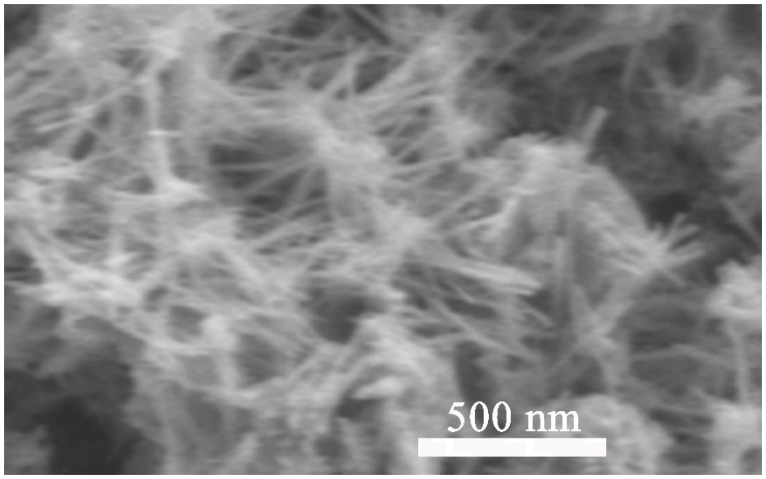

Fig. S4 The high-magnification SEM image of Fig. 5B.

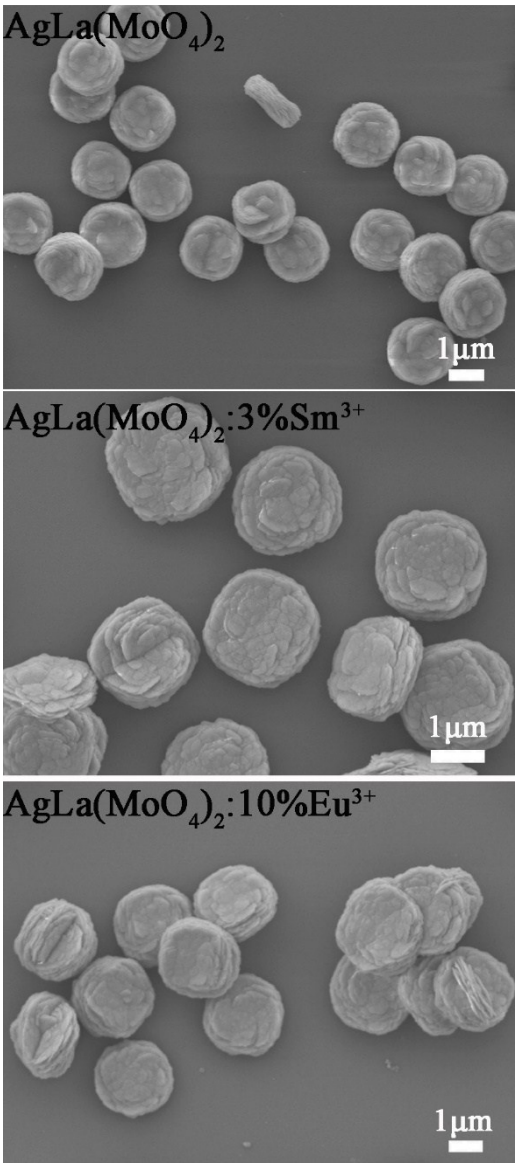

Fig. S5 The SEM pictures of $AgLa(MoO_4)_2$: Ln^{3+} samples prepared at pH=4, 200℃ and 24 h.

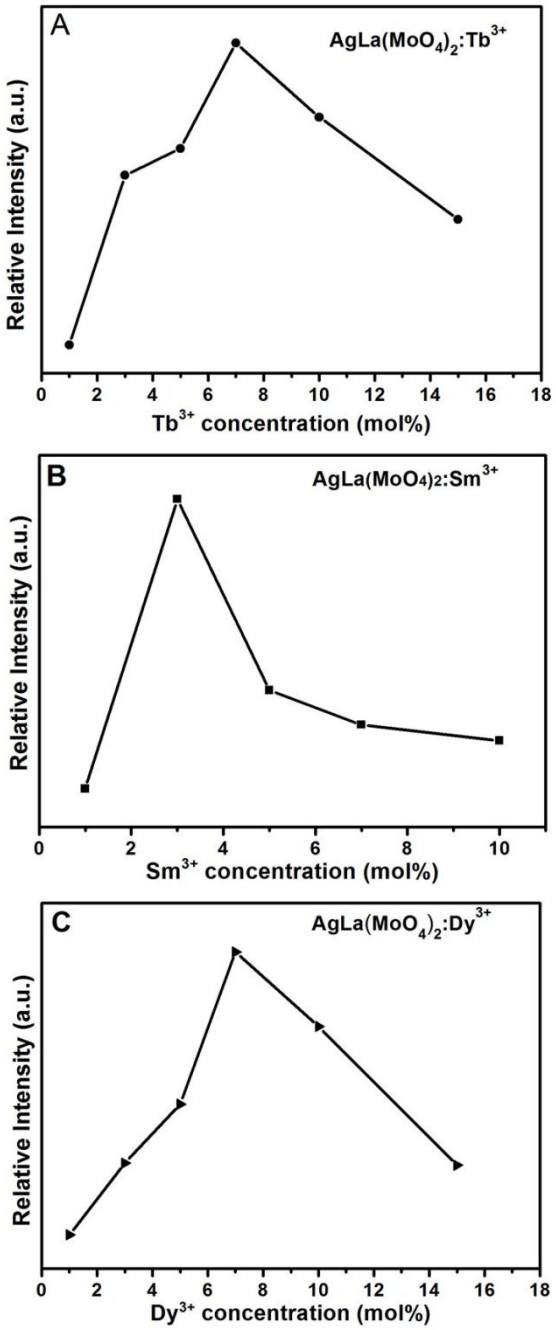

Fig. S6 The photoluminescence emission intensity of Ln^{3+} ions as a function of their doping concentrations in $AgLa(MoO_4)_2$ nanocrystals, respectively. The optimum concentrations of Ln^{3+} are determined to be as 7% (Tb^{3+}), 3% (Sm^{3+}), 7% (Dy^{3+}), respectively.

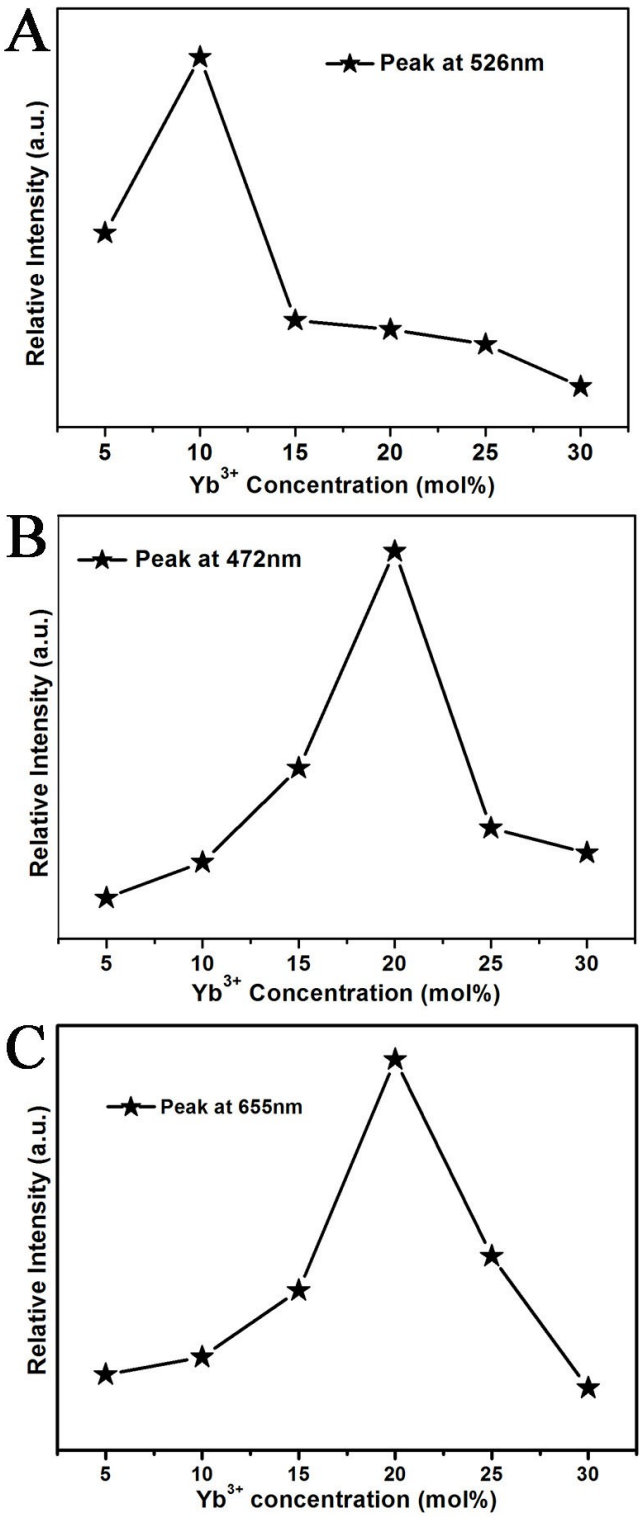

Fig. S7 The upconversion emission intensity of different concentration of Yb^{3+} ions in $AgLa(MoO_4)_2$ nanocrystals when the concentration of Er^{3+}, Tm^{3+}, Ho^{3+} is fixed at 1%, respectively.