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

Supporting Information

Growth of SnO_2 nanocrystals co-doped with Eu^{3+} for highly enhanced photoluminescence in mesoporous silica glasses

1. Synthesis of Eu^{3+} doped SnO_2 powder

Eu^{3+} doped SnO_2 powder was prepared by a simple co-precipitation method.[1, 2] $EuCl_3 \cdot 6H_2O$ (99.99%) and $SnCl_4 \cdot 5H_2O$ (99.995%) were dissolved in deionized water. The original molar ratio of Eu^{3+} to Sn^{4+} is 5%. The mixture was stirred for about 1 hour to become homogenous solution. Ammonium hydroxide ($NH_3 \cdot H_2O$) as the precipitator was added in the solution until the PH reach 8. The final solution was stirred for 3 hours at 80 °C and followed a filtration. The obtained precursor was thoroughly washed, dried at 50 °C and annealed at 1000 ℃ for 3 hours. Finally, the Eu^{3+} doped SnO_2 powder was formed.

2. Supplementary Tables

Table S1. Dopants Concentration of the synthesized samples with different concentration of Eu^{3+}

Samples	dopants (mol/L)
	$EuCl_3 \cdot 6H_2O$
Eu 0	0
Eu 0.05	0.05
Eu 0.15	0.15
Eu 0.20	0.20
Eu 0.25	0.25
Eu 0.30	0.30

Table S2. Dopants Concentration of the synthesized samples with different concentration of SnO_2 NCs

Samples	dopants (mol/L)	
	$EuCl_3 \cdot 6H_2O$	$SnCl_4 \cdot 5H_2O$
Sn 0	0.20	0
Sn 0.20	0.20	0.20
Sn 0.40	0.20	0.40
Sn 0.60	0.20	0.60

Table S3. Dopants Concentration of Sn 0.40 single-doped glasses and the sample co-doped with very low Eu^{3+} ions

Samples	dopants (mol/L)	
	$EuCl_3 \cdot 6H_2O$	$SnCl_4 \cdot 5H_2O$
Sn 0.40 single-doped	0	0.40
Sn 0.40 Eu 0.0005	0.0005	0.40

3. Supplementary Figures

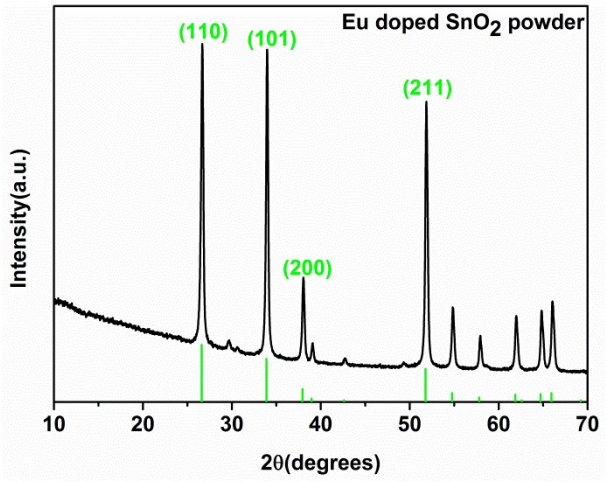

Fig. S1 XRD patterns of Eu doped SnO_2 powder

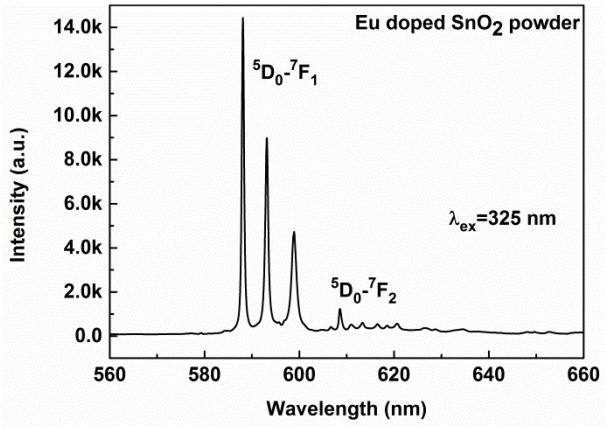

Fig. S2 PL spectra of Eu doped SnO_2 powder excited at 325 nm

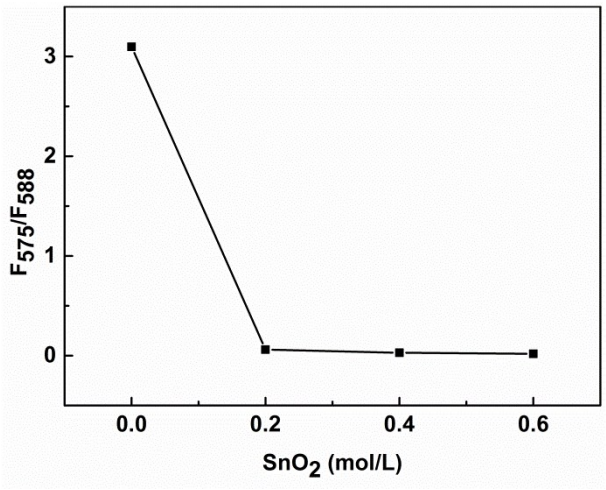

Fig. S3 The ratio of PL emission intensity at 575 nm and 588 nm (F_{575}/F_{588}) as a function of SnO_2 NCs concentration

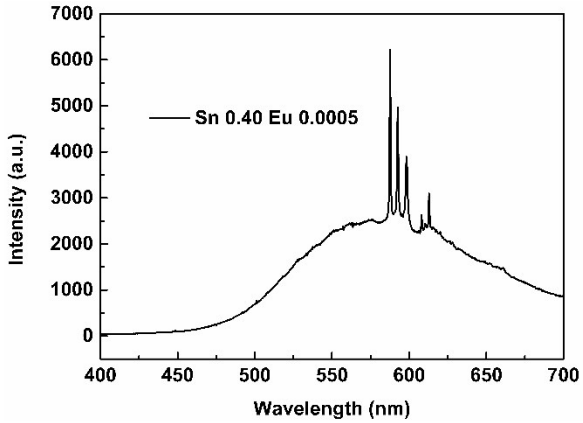

Fig. S4 PL emission spectra of Sn 0.40 Eu 0.0005 excited by 325 nm

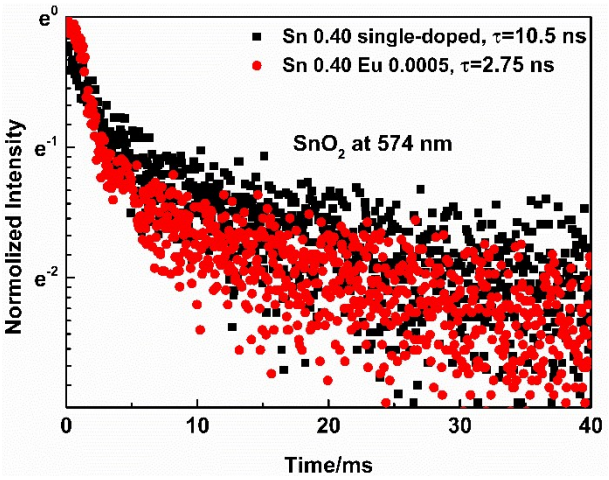

Fig.S5 PL decay curves of Sn 0.40 single-doped and Sn 0.40 Eu 0.0005 at 574 nm of SnO_2 NCs excited by 325 nm

References

1. D.-S. Lee, J.-K. Jung, J.-W. Lim, J.-S. Huh and D.-D. Lee, *Sensors and Actuators B: Chemical*, 2001, **77**, 228-236.
2. A. Bouaine, N. Brihi, G. Schmerber, C. Ulhaq-Bouillet, S. Colis and A. Dinia, *The Journal of Physical Chemistry C*, 2007, **111**, 2924-2928.