Electronic Supplementary Information

Highly efficient warm white light emitting Eu^{2+} activated silicate host: Another fabulous work of mesoporous silica

Sakthivel Gandhi,[a,b] Kavitha Thandavan,[b] Bong-Joon Kwon,[a] Hyun-Joo Woo,[a] Chang Hae Kim,[c] Soung Soo Yi,[d] Jung Hyun Jeong,[e] Dong-Soo Shin[f] and Kiwan Jang*[a]

Table S1. A comparative study on the physical properties of MPS and conventional silicate source (SiO_2).

Physical Properties	Materials	
	MPS	**Silica (SiO_2)**
Surface are (m^2/g)	750	~150
Pore size (nm)	7	–
Pore volume (cm^3/g)	1.12	–
Size (μm)	1–5	100–150
Features	Rod like morphology along with highly ordered porous structure.	Non-uniform morphology with dis-ordered porous system.

Table S2. A comparative study on the phosphor properties among the materials namely YAG:Ce, Conventional SiO_2 assisted $SrCaSiO_4$: Eu^{2+} & MPS assisted $Sr_{0.975}Ca_{0.975}Eu_{0.05}SiO_4$ phosphors.

Properties		**Materials**					
		YAG:Ce		**Conventional SiO_2 assisted $SrCaSiO_4$: Eu^{2+}**	**MPS assisted $Sr_{0.975}Ca_{0.975}Eu_{0.05}SiO_4$**		
						LED (400 nm)	**LED (450 nm)**
CIE	**x**	0.35	0.28	0.22	0.50	0.42	0.44
	y	0.62	0.30	0.49	0.48	0.39	0.40
CCT (K)		-	8900	-	-	3350	3100
CRI		-	< 75	-	-	81	80
QE (%)		85	-	45	72	-	
Dopant concentration (mol%)		1	1	0.5	0.5	0.5	0.5
Emission range (nm)		475–675	475–675	450–525	450–700	450–725	500–750
FWHM (nm)		~100	~100	70	150	160	140
Emission peak (nm)		~540	~540	510	585	595	600
Emission intensity compared to YAG:Ce		1	-	0.3	1.1	-	

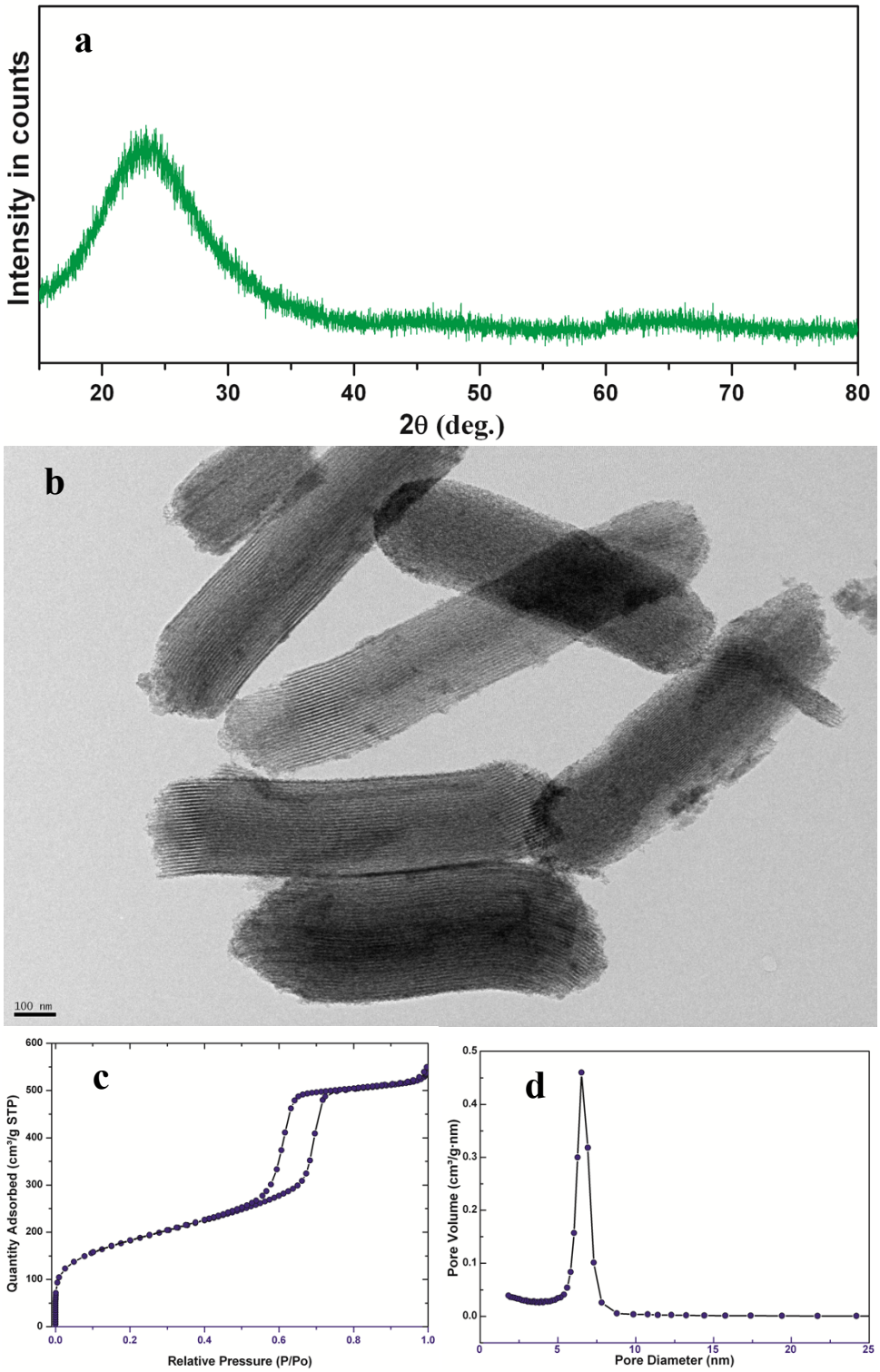

Figure S1. Powder XRD (a), FE-TEM (b), Nitrogen isotherm (c) & BJH isotherm (d) of MPS used for synthesizing $Sr_{0.975}Ca_{0.975}Eu_{0.05}SiO_4$ phosphor.

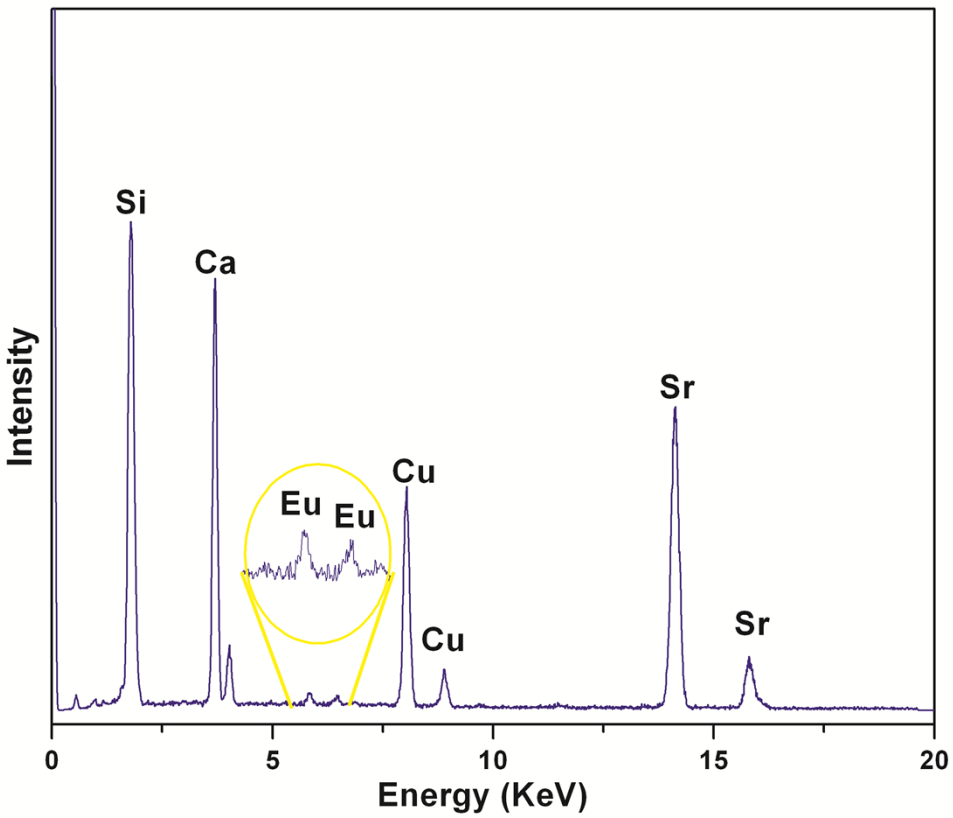

Figure S2. Elemental analysis of MPS assisted $Sr_{0.975}Ca_{0.975}Eu_{0.05}SiO_4$ phosphor analyzed using TEM-EDS.

5

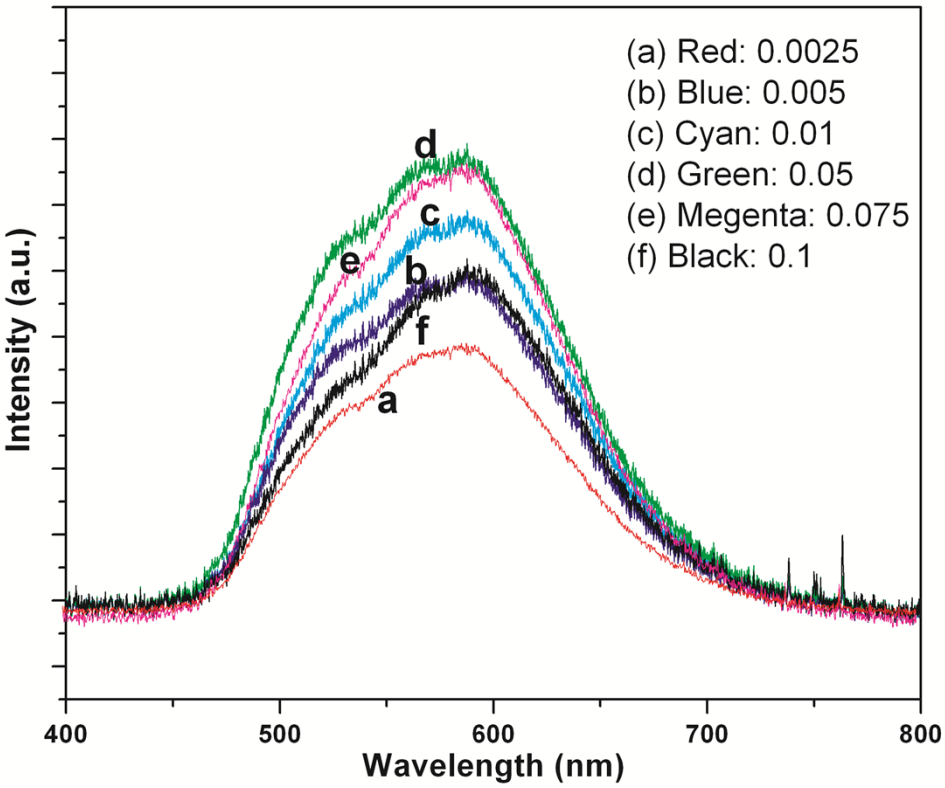

Figure S3. Concentration dependant luminescence of MPS assisted $Sr_{0.975}Ca_{0.975}Eu_{0.05}SiO_4$ phosphor (0.0025 to 0.1).

5

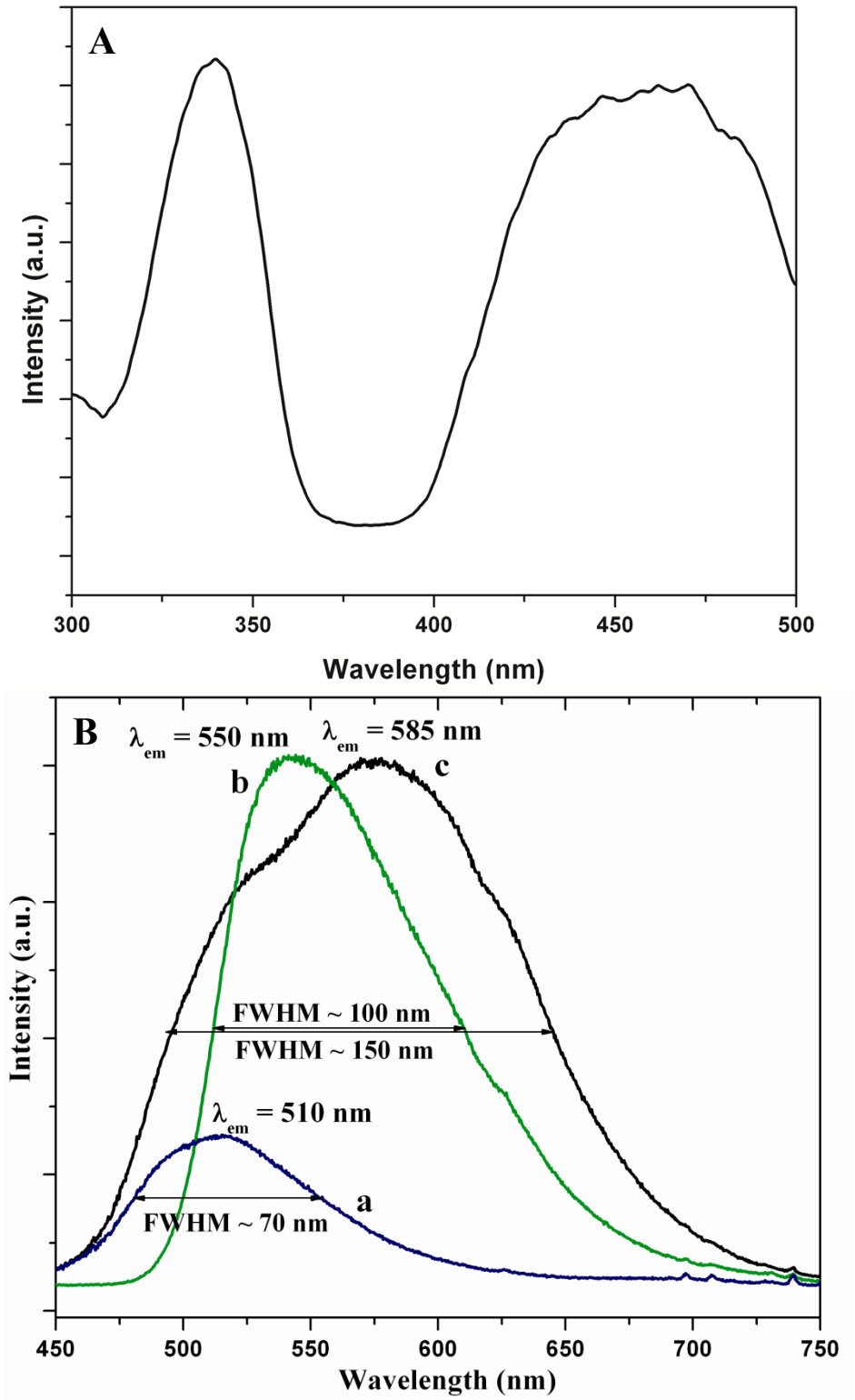

Figure S4.(A) Excitation spectra of YAG:Ce measured at 550 nm of emission. (B) Normalized luminescence emission spectra of SiO_2 assisted $SrCaSiO_4:Eu^{2+}$ (a), YAG:Ce (b) and MPS assisted $Sr_{0.975}Ca_{0.975}Eu_{0.05}SiO_4$ (c) phosphors acquired under 370, 460 & 375 nm, respectively. It can also be noted that our $Sr_{0.975}Ca_{0.975}Eu_{0.05}SiO_4$ phosphor shows the enhanced orange-red emission when compared to YAG:Ce.

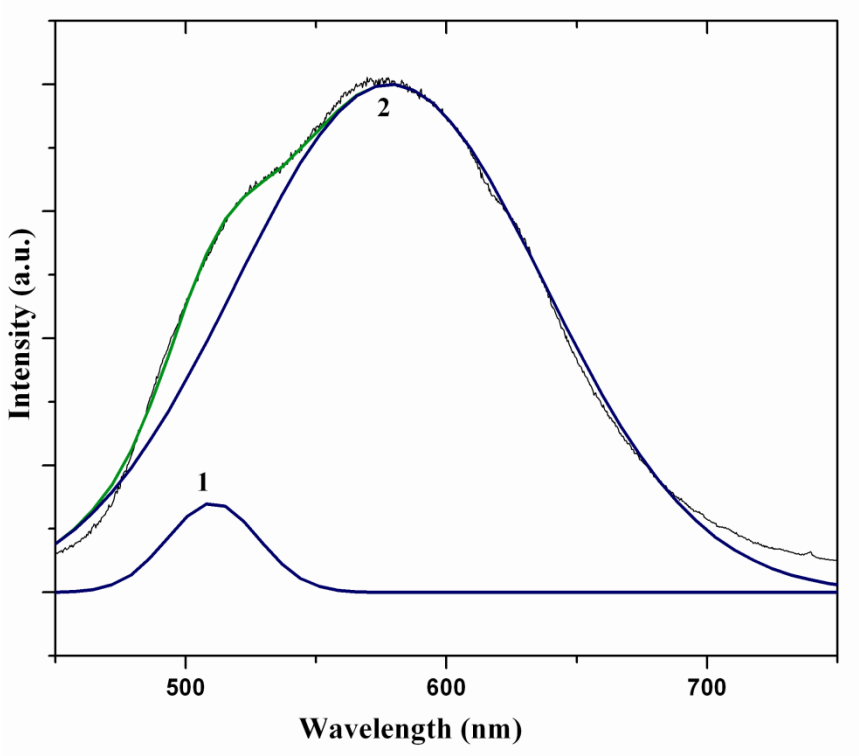

Figure S5. The Gaussian fit of MPS assisted $Sr_{0.975}Ca_{0.975}Eu_{0.05}SiO_4$ phosphor's emission.

5

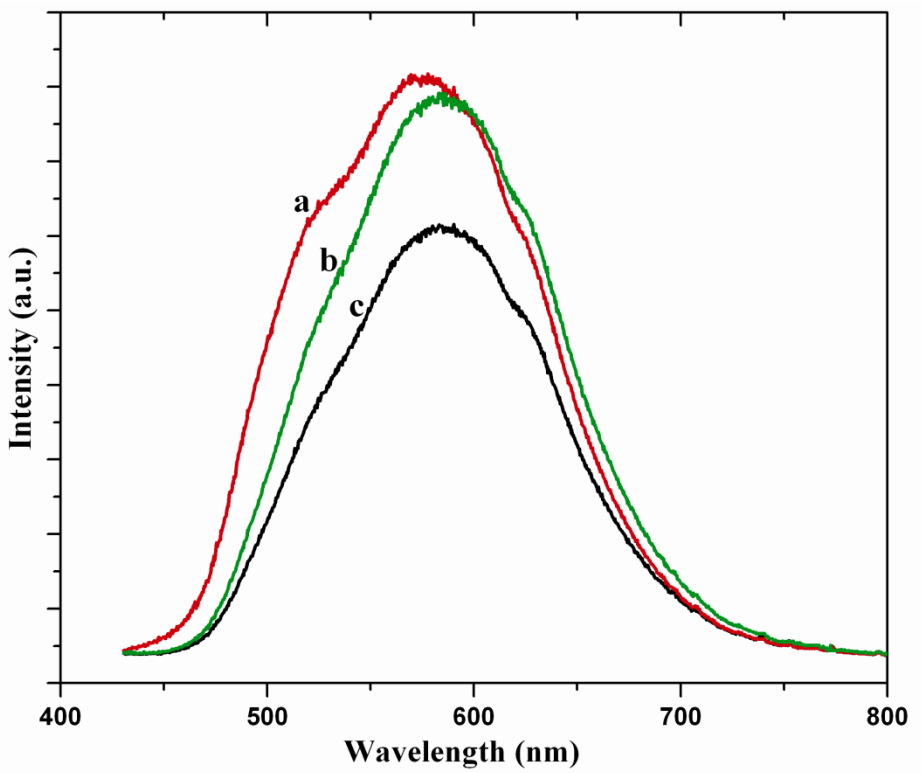

Figure S6. Emission behavior of MPS assisted $Sr_{0.975}Ca_{0.975}Eu_{0.05}SiO_4$ phosphor under different excitation wavelengths 380 (a), 400 (b) & 450 nm (c).

5