Electronic Supplementary Material (ESI) for RSC Advances.

Supporting information

Preparation of structurally colored films assembled by Polystyrene@Silica, air@Silica and air@Carbon@Silica core-shell nanoparticles with enhanced color visibility

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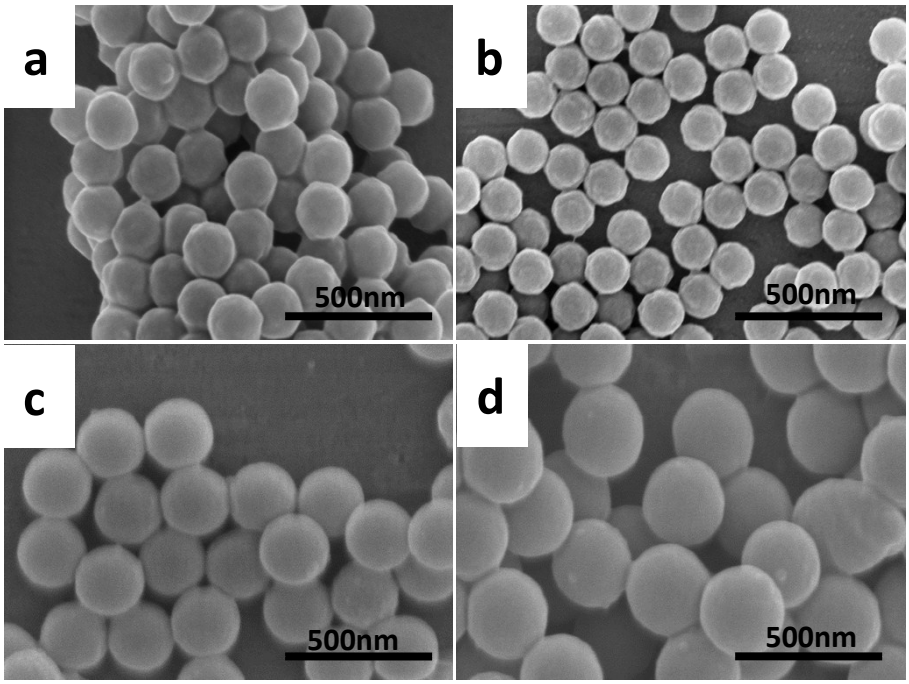

Figure S1. PS spheres of different size with a low polydispersity have been prepared by the emulsifier-free emulsion polymerization method: a)180±5 nm, b)200±5 nm, c)240±5 nm, and d)290±5 nm

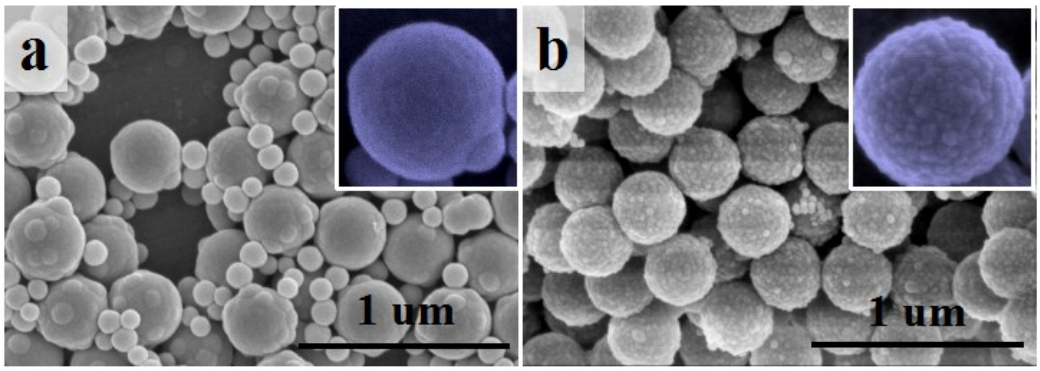

Fig. S2 (a) SiO_2 coated PS (PS was used without modification) (b) SiO_2 coated PS (PS was modified by $NH_3 \cdot H_2O$); inserts in (a) – (b) are high-magnification SEM images.

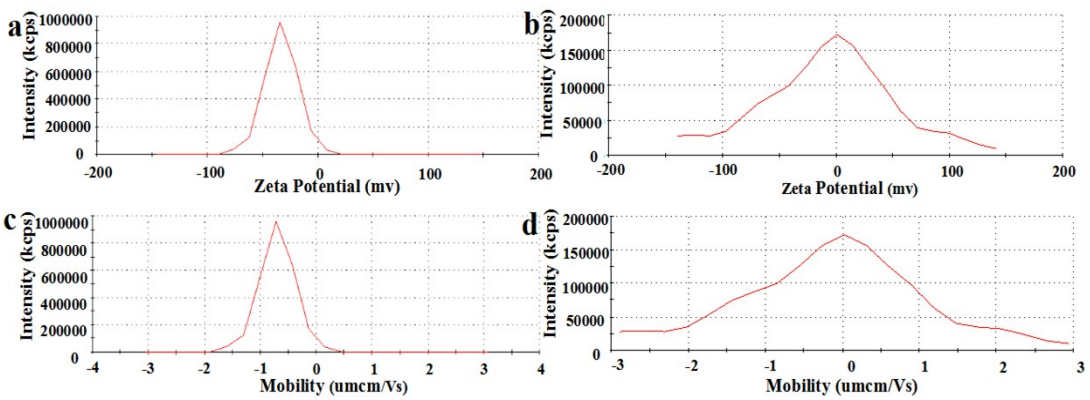

Fig. S3 Electrophoretic measurements on PS colloids: zeta potential for bare (a) and ammonium hydroxide modifed (b) PS colloids; electrophoretic mobility of bare (c) and ammonium hydroxide modifed PS (d) colloids.

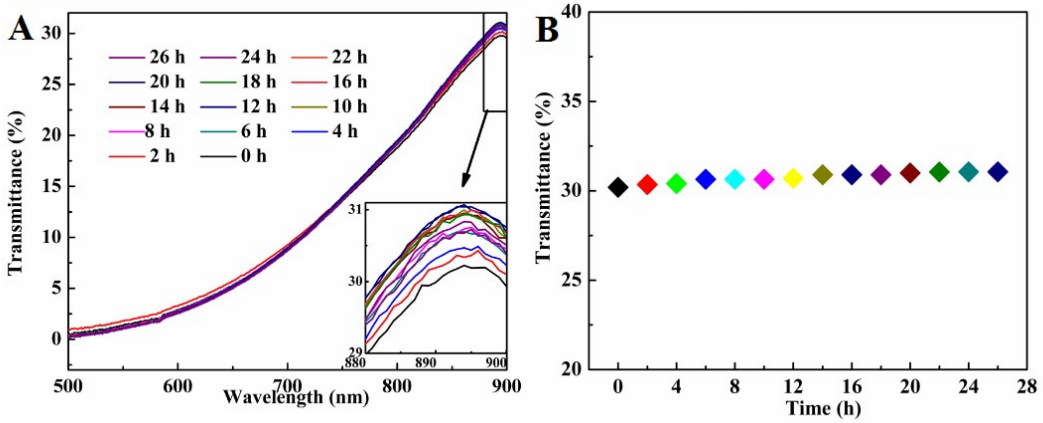

Fig. S4 Transmittance changes of the PS@SiO_2 solution over times.

Table S2. the size, and shell thickness of the core−shell particles before and after calcination

sample	Core particle	C_{TEOS} (uL)	$D_{PS@SiO2}$ (nm)	$D_{Air@SiO2}$ (nm)	Shell thickness (nm)	Ref peak(nm)
PS180	180±5	100	220 ± 5	210± 5	15	387
PS200	200±5	150	250 ± 5	240± 5	20	448
PS240	240±5	200	300 ± 5	290± 5	25	545
PS290	290±5	200	340 ± 5	330± 5	20	599