Supporting Information

Precise preparation of highly monodisperse ZrO$_2$@SiO$_2$ core-shell nanoparticles with adjustable refractive index

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Fig. S1 Size distribution of ZrO$_2$ nanoparticles and resulted ZrO$_2$@SiO$_2$ CSNs.
Fig. S2 FT-IR spectra of ZrO$_2$ prepared without (a) and with (b) citric acid.

Fig. S3 The change of silica shell thickness prepared by different concentrations of TEOS.
**Fig. S4** Comparison photos of ZrO$_2$ nanoparticles (left) and methyl modified ZrO$_2$@SiO$_2$ nanoparticles (right) dispersed in (A) dimethyl benzene, (B) isoamyl alcohol and (C) chloroform. (D) is the dispersion of modified ZrO$_2$@SiO$_2$ in ethanol.
**Fig. S5** Photographs of CSNs dispersed in different conditions after storage for more than 2 months: (A) ZrO$_2$@SiO$_2$ CSNs in ethanol; (B) to (D) are the photos of MTES modified ZrO$_2$@SiO$_2$ CSNs dispersed in ethanol, isoamyl alcohol and chloroform, respectively. (E) is the corresponding DLS curves of (A) to (D).