**Electronic Supplementary Information**

# Synthesis of water-degradable silica nanoparticles from carbamate-containing bridged silsesquioxane precursor

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**Contents**
1. Molybdenum blue colorimetric experiment
2. Supplementary table
3. Supplementary figures

# 1. Molybdenum Blue colorimetric experiment

All the solutions were contained in polyethylene bottles. Standard silicic acid solution was made by diluting sodium silicate solution ($Na_2Si_3O_7$, 242.23 g/mol). Three solution stocks were prepared: (1) 3.1 g of ammonium molybdate tetrahydrate dissolved in 50 mL of 1 M sulfuric acid, (2) 6.3 g of oxalic acid dihydrate dissolved in 50 mL of Millipore water, and (3) 1.76 g of ascorbic acid dissolved in 50 mL of Millipore water. Sonication was used to help dissolve the salts. In order to make a calibration curve, the standard silicic solutions with concentrations of $1.72 \times 10^{-5}$ M, $8.56 \times 10^{-5}$ M, $1.703 \times 10^{-4}$ M, $2.54 \times 10^{-4}$ M, $3.37 \times 10^{-4}$ M, and $4.195 \times 10^{-4}$ M were prepared, respectively. 100 $\mu$L of solution 1 was added to 2 mL of the sample. After 10 min, the solution became yellow due to the formation of yellow phosphate molybdenum complex. 100 $\mu$L of solution 2 was then added and the yellow color faded in 1 min. The addition of 100 $\mu$L of solution 3 resulted in a color change to blue. The mixture was allowed to sit for an additional 10 min until the completion of the blue complex formation. The UV-vis spectrum featured a molybdenum blue peak at 810 nm. The concentration of silicic acid was calculated from the calibration curve. 10 mg of 340 nm Stöber SiNPs and ICPTES-sorbitol SiNPs were each separately dispersed in 20 mL of Millipore water. An aliquot of each solution was centrifuged every hour. 100 $\mu$L of each supernatant was diluted by 2 mL of water, and the resulting solutions were tested by the procedure aforementioned.

# 2. Supplementary table

**Table S1.** The reaction conditions for fabrication of ICPTES-Sorbitol SiNPs

| Run No. | ICPTES-Sorbitol (mol) $\times 10^{-4}$ | TEOS (mol) $\times 10^{-3}$ | Ethanol (mL) | NH$_4$OH (mL) | Time (hr) |
|---|---|---|---|---|---|
| 1 | 3.0 | 0.68 | 10 | 5 | 18 |
| 2 | 3.0 | 1.4 | 10 | 5 | 18 |
| 3 | 3.0 | 4.5 | 10 | 5 | 18 |
| 4 | 3.0 | 4.5 | 11.25 | 3.75 | 18 |
| 5 | 3.0 | 9.0 | 12 | 4 | 18 |
| 6 | 0.30 | 0.14 | 10 | 5 | 2 |
| 7 | 0.60 | 0.28 | 10 | 5 | 2 |

# 3. Supplementary figures
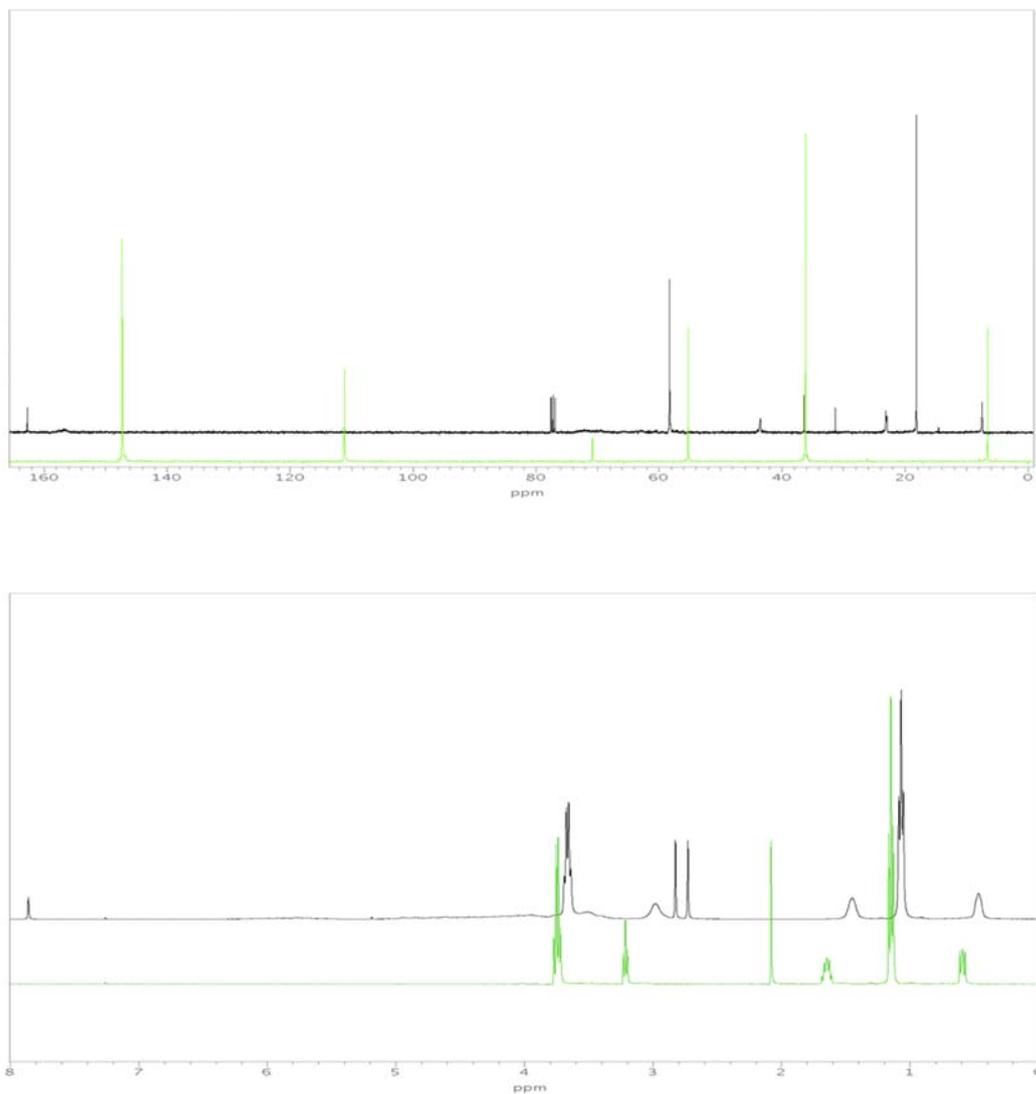


**Fig. S1.** $^{13}$C NMR (Top) and H NMR (Bottom) overlay spectra of ICPTES (Green) and ICPTES-Sorbitol (Black).
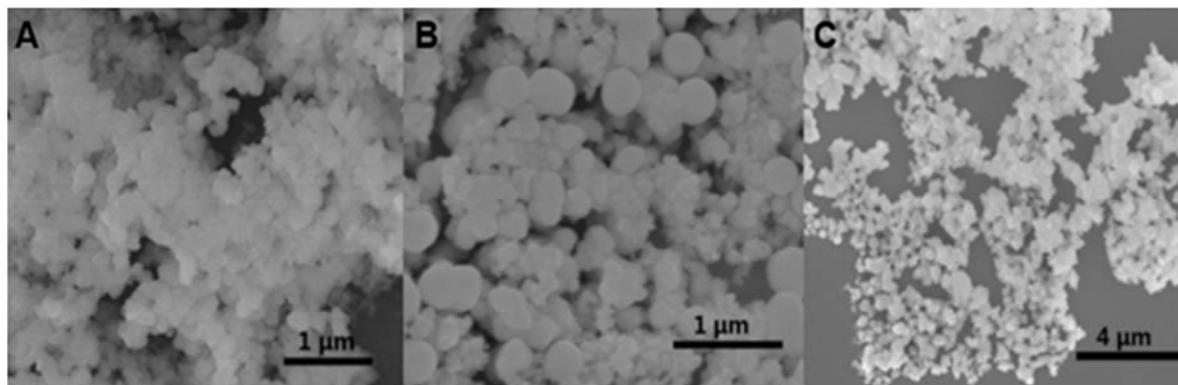


**Fig. S2.** SEM images of ICPTES-Sorbitol SiNPs synthesized with increasing (a < b < c) concentration of TEOS.
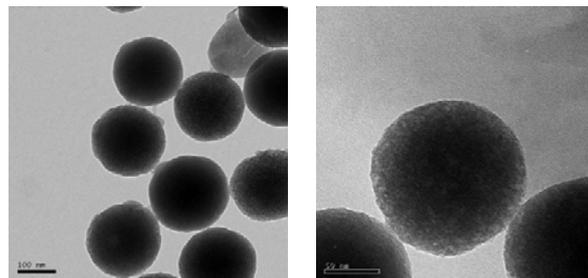
**Fig. S3.** TEM images of the nanoparticles hydrolysis in water (HCl, pH 2) after 3 weeks.
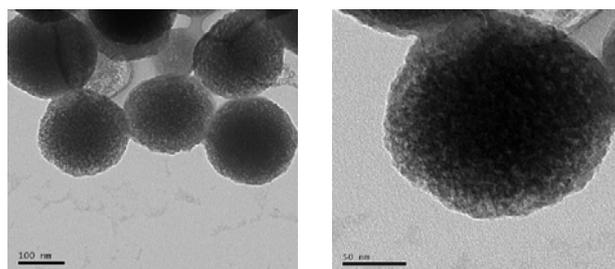


**Fig. S4.** TEM images of the nanoparticles hydrolysis in SBF (pH 7.4) after 3 weeks.
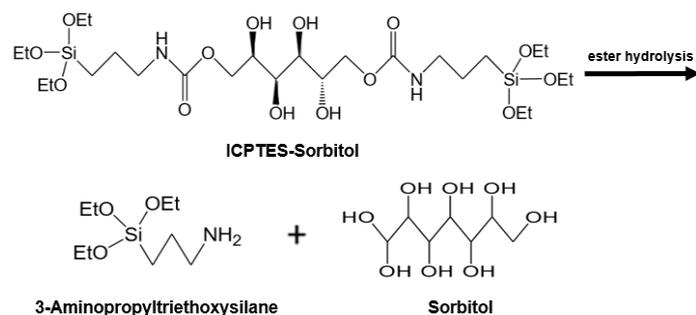


**Fig. S5.** Proposed hydrolysis mechanism of ICPTES-Sorbitol.
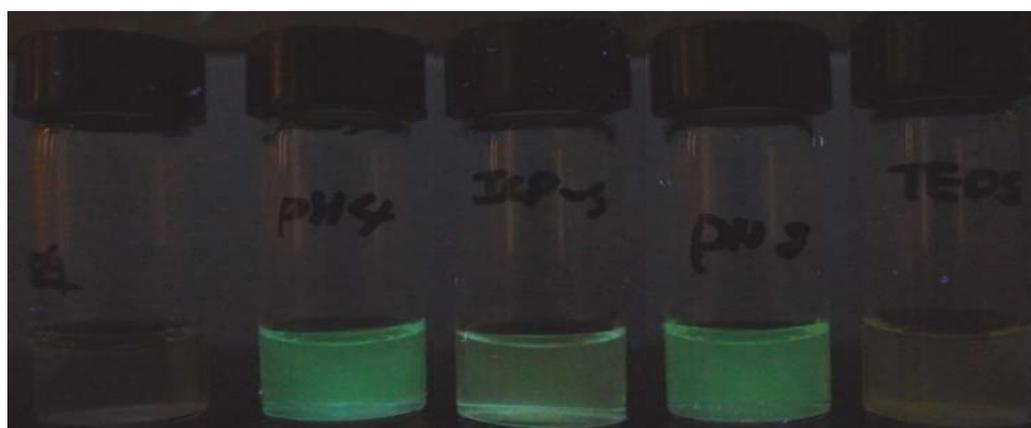


**Fig. S6.** Dansyl chloride reacted with primary amines from the hydrolysis of the nanoparticles (left to right): ICPTES-Sorbitol SiNPs at pH 2, pH 4, pH 7, pH 8, TEOS SiNPs at pH 7.