Supporting Information for

Facile scalable synthesis of highly monodisperse small silica nanoparticles using alkaline buffer solution and its application for efficient sentinel lymph node mapping

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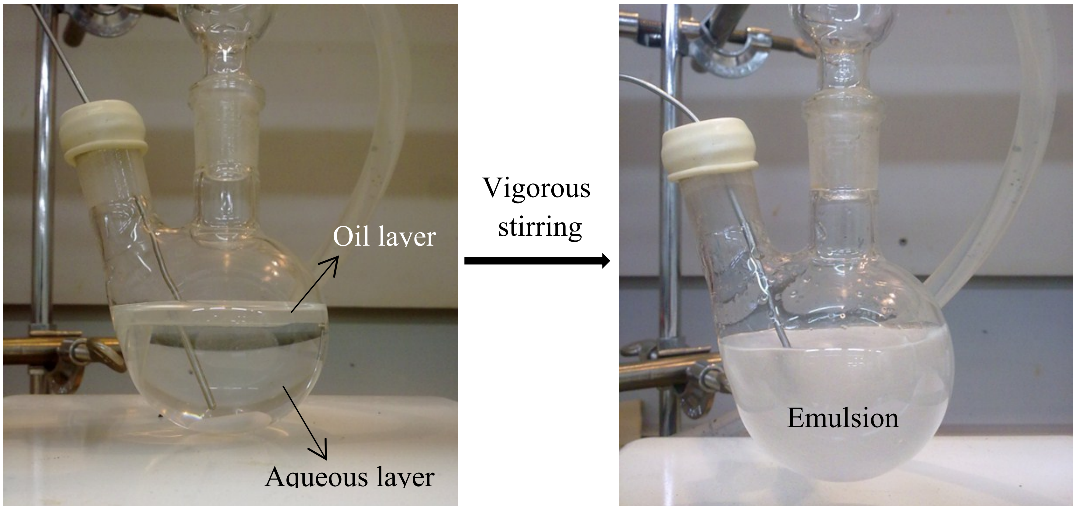
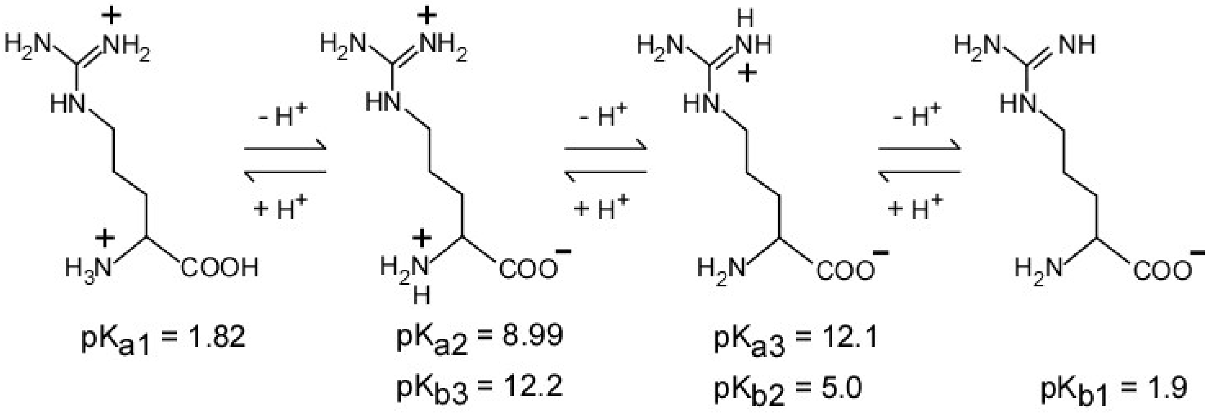


Fig. S1 Photographs of silica nanoparticles formation in alkaline buffer solution. Organic/inorganic biphasic solution was turned to an emulsion with vigorous stirring for large scale synthesis.



H_3Arg^{2+} H_2Arg^{+} HArg Arg^{-}

Scheme S1 L–arginine Equilibrium Relations.

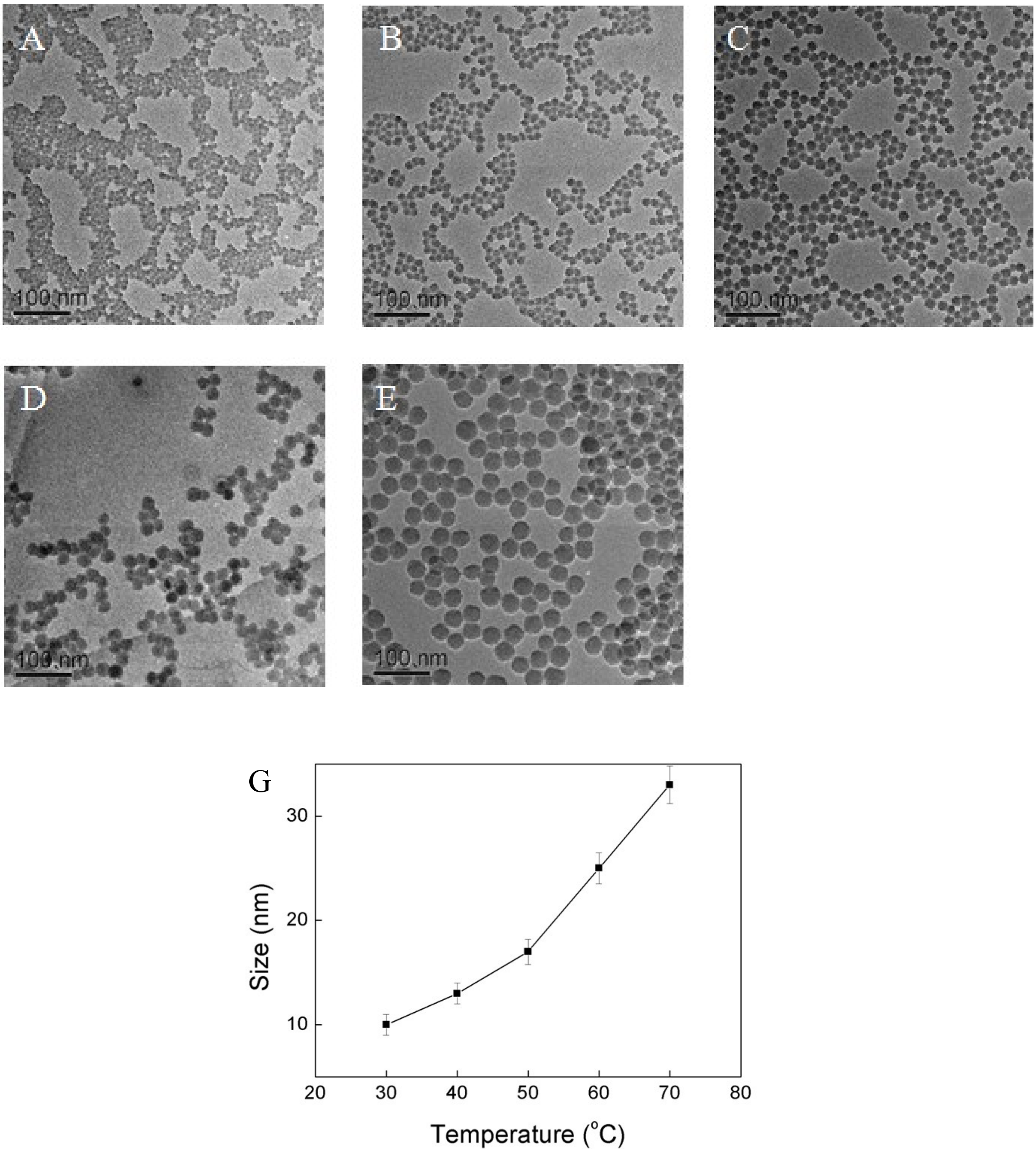


Fig. S2 Synthesis of silica nanoparticles by using $NH_4Cl{\cdot}NH_3$ buffer solution (pH= 9.0) at (A) 30 °C (10 nm), (B) 40 °C (13 nm), (C) 50 °C (17 nm), (D) 60 °C (25 nm) and (E) 70 °C (33 nm). (F) The diameter sizes of silica nanoparticles are increasing with rising temperature.

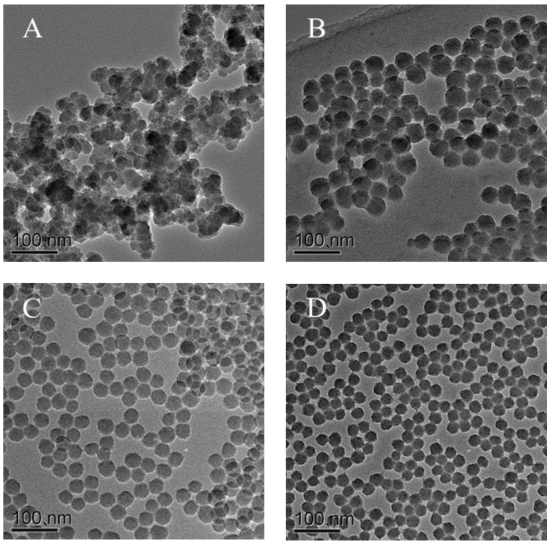


Fig. S3 TEM images of silica nanoparticles using a $NH_4Cl{\cdot}NH_3$ buffer solution of (A) pH = 7.0, (B) pH = 8.0, (C) pH = 9.0, and (D) pH = 9.8.

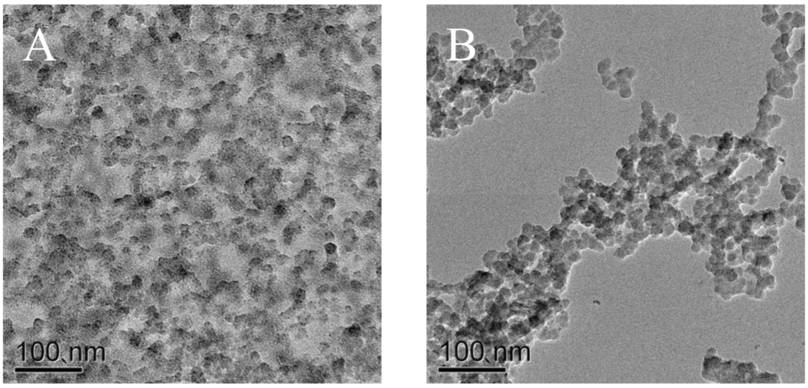


Fig. S4 Synthesis of silica nanoparticles by using $NH_4Cl{\cdot}NH_3$ buffer solution (pH= 7.0) at (A) 30 °C and (B) 50 °C.

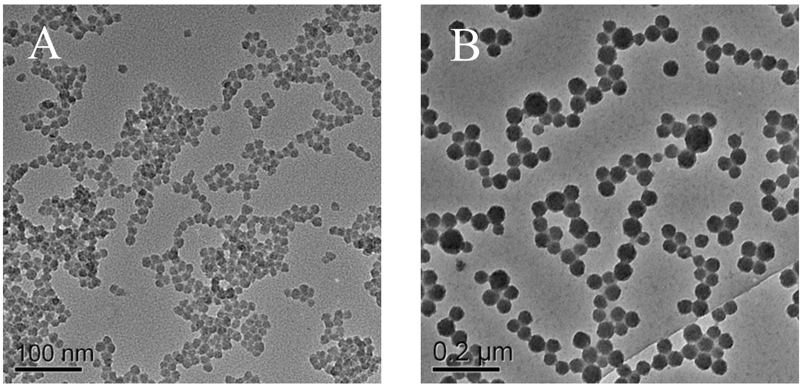


Fig. S5 Synthesis of silica nanoparticles by using (A) a KCl·NaOH buffer solution (pH = 11.8) and (B) an EDTA·NaOH buffer solution (pH = 8.0).

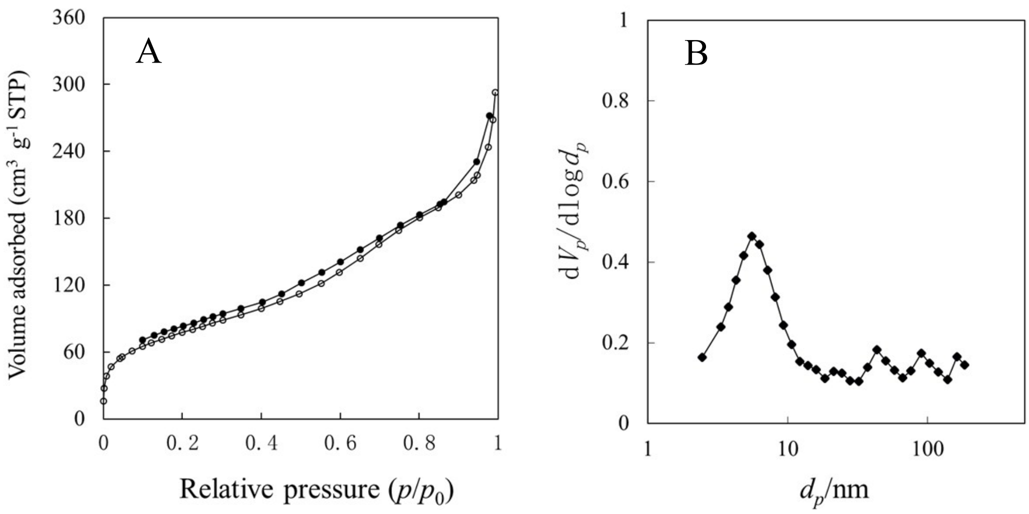


Fig. S6 (A) Nitrogen-adsorption/desorption isotherm and (B) pore size distribution curve of silica nanoparticles (20 nm).

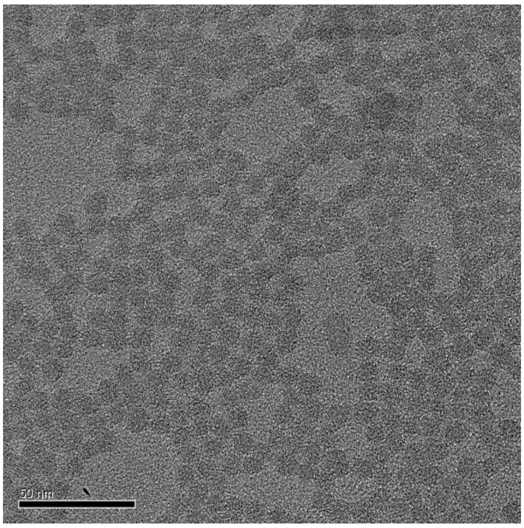


Fig. S7 High magnification TEM image of silica nanoparticles (scale bar: 50 nm).

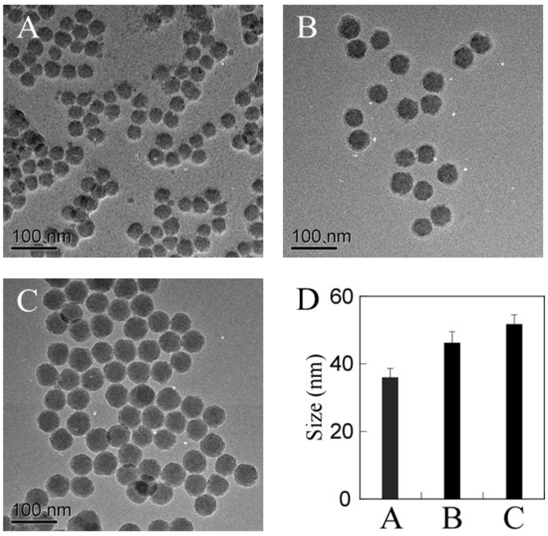


Fig. S8 (A) TEM image of silica nanoparticles with particle sizes of 35 nm; silica nanoparticles were synthesized by using $NH_4Cl{\cdot}NH_3$ buffer solution (pH = 9.0). (B) 46 nm silica nanoparticles were produced by one-stage regrowth, and (C) 51 nm silica nanoparticles were produced by two-stage regrowth using an *in situ* regrowth approach. (D) Plot of silica nanoparticle sizes.

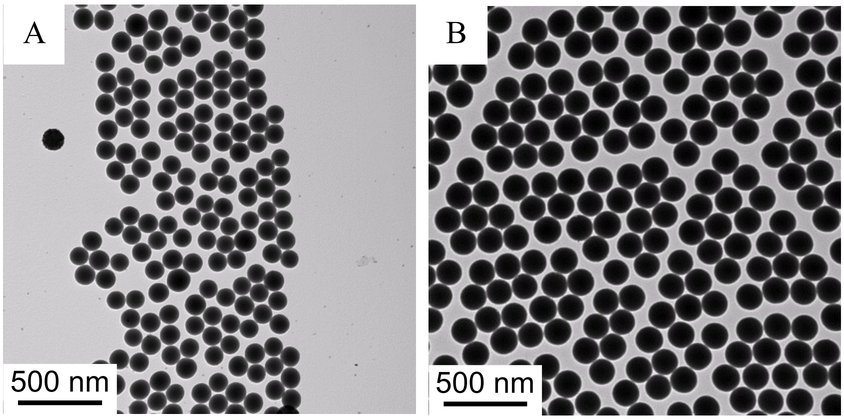


Fig. S9 TEM images of silica nanoparticles with (A) 100 nm and (B) 150 nm sizes by using the Stöber regrowth approach.

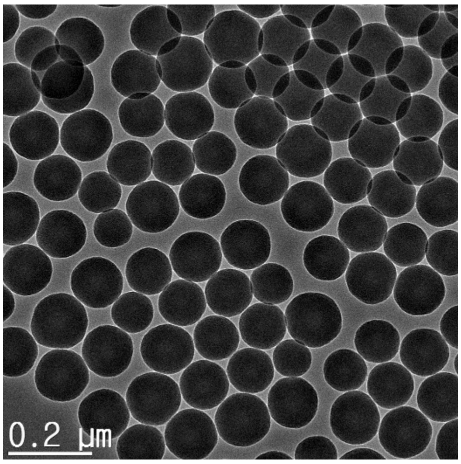


Fig. S10 TEM image of RITC-doped silica nanoparticles.

Table S1. Fabrication of dye doped silica nanoparticles.

Method		Dye	Size	references
Modified Stöber method	Dye-ATPS conjugates	FITC	140-500 nm	A. van Blaaderen et al. [1]
	Dye-ATPS conjugates	FITC, R6G, and ROX	70 nm	Weihong Tan et al. [2]
	Dye-ATPS conjugates	FITC, TRITC	50-70 nm	Ulrich Wiesner et al.[3]
	silane-modified dye/PEG-shell	IR783	20 nm	Jianjun Cheng et al.[4]
	silica-core/PEG-shell	Cy5, Cy5.5, RhG, TMR, DY782, and CW800	<10 nm	Ulrich Wiesner et al.[5]
Reverse microemulsion method	Triton X-100 /hexanol /cyclohexane /H_2O	Rubpy	5-400nm	Weihong Tan et al. [6]
	Triton X-100 /hexanol /cyclohexane /H_2O	TMR-dextran	60 nm	Weihong Tan et al. [7]
	Triton X-100 /hexanol /cyclohexane /H_2O	OsBpy, RuBpy	70 nm	Weihong Tan et al.[8]
Amino acid approach	Catalyst: L-lysine	RuBpy	17-30 nm	Sam R. Nugen et al.[9]
Alkaline buffer approach	Catalyst: alkaline buffer	RITC	7-30 nm	This work

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