Electronic Supplementary Material (ESI) for Analytical Methods.

Supporting Information for: A systematic comparison of different techniques to determine the zeta potential of silica nanoparticles in biological medium

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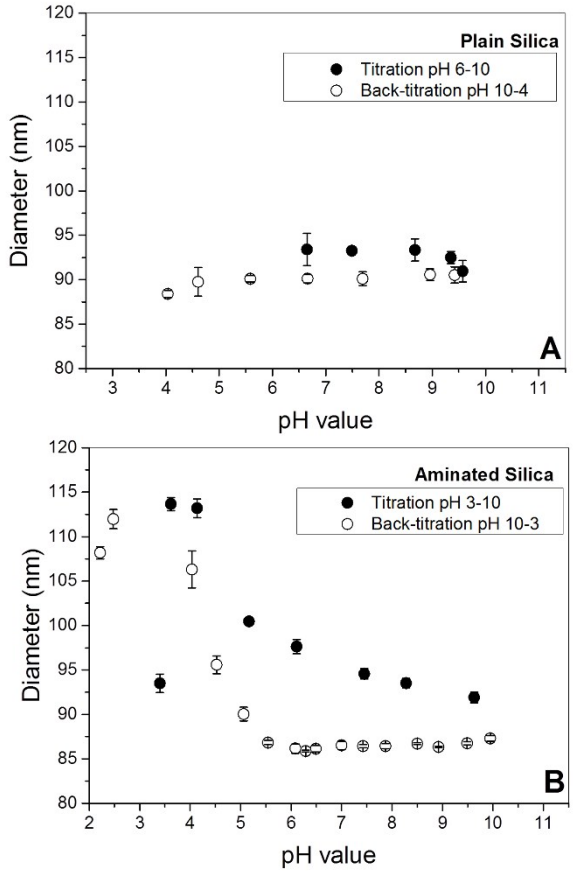

Figure S1. Particle size (DLS cumulants method) measurements of plain(A) and aminated (B) silica NPs at different pH.

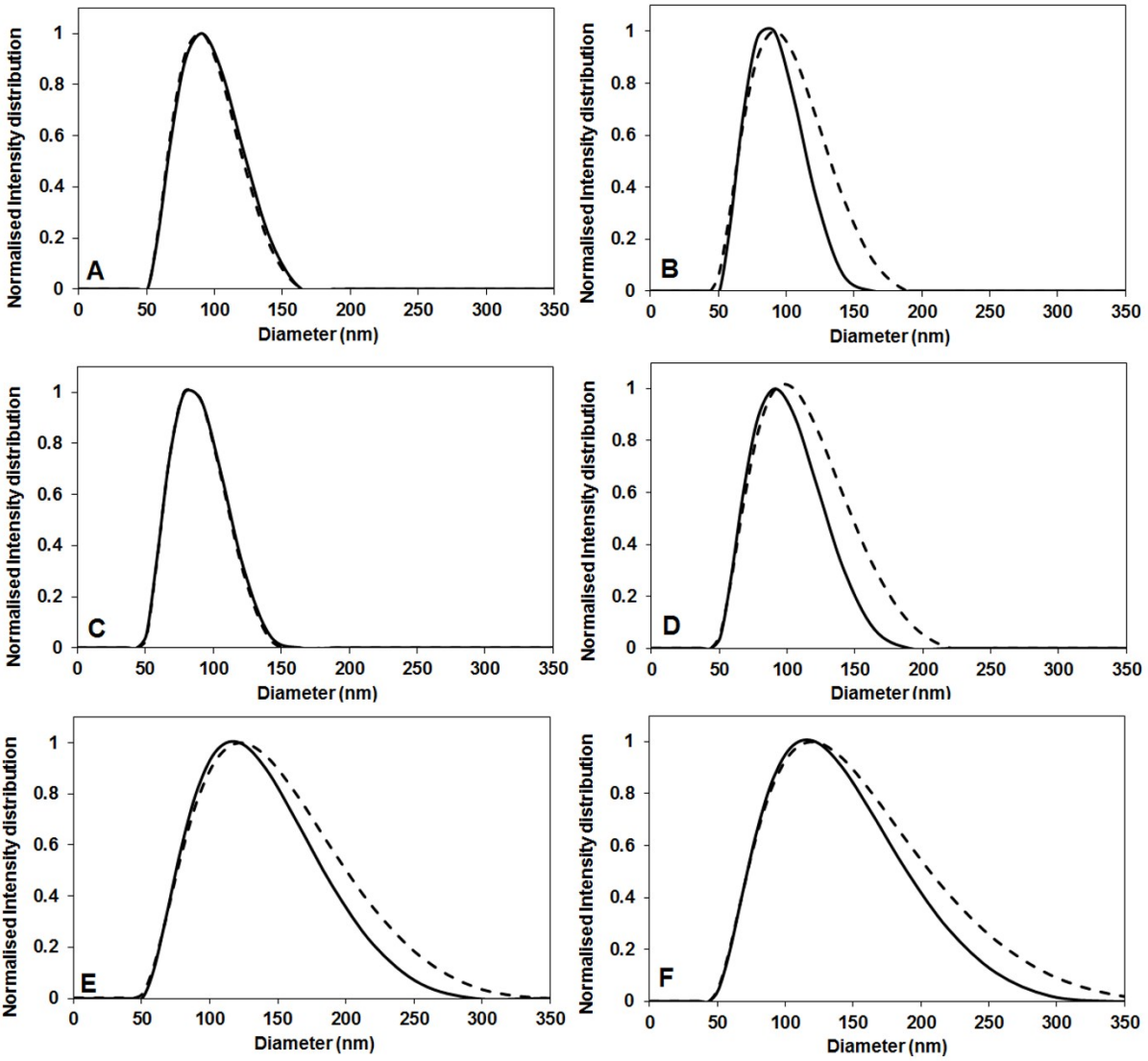

Figure S2. Representative DLS normalised scattered light intensity-weighed particle size distributions obtained at 0 h (continuous line) and 24 h (dash line) after dispersing plain (A, C and E) and aminated (B, D and F) silica NPs in purified water (A and B), Tris-HCl (C and D) and 10 % FBS-EMEM (E and F) respectively.

Table S1. Additional technical requirements for ζ–potential measurements.

Properties	ELS	TRPS	zPTA
NP size range	3.8 nm to 100 µm	70 nm to 800 nm (for larger particles the recommendation is to contact Izon)	10-20 nm to 1-2 µm depending on particle refractive index, medium, sensitivity of the camera, and wavelength and power of the laser.
Measurable concentration range	<10 nm: 0.5 g/L - limited by sample material interaction, e.g. aggregation. 10-100 nm: 0.1 mg/L to 5% mass, assuming a density of 1 g/cm^3 100 nm-1 µm: 0.01 g/L -1% mass assuming a density of 1g/cm^3 >1µm: 0.1g/L-1% mass)	10^5-10^{12} NPs/mL	10^7-10^{10} NPs/mL
Optimal concentration	Dependent on the scattering properties of the measured materials and the particle size. Should be determined experimentally	1 x 10^9 NPs/mL to 5 x 10^{10} NPs/mL depending on size	Dependent on the scattering properties of the material. The recommended number of NPs in the field of view is 20-60. For silica NPs optimal concentration was found between 10^8 to 10^9 NPs/mL.
Type of buffers	Aqueous/polar/non-polar. Highly conductive samples can lead to electrode polarisation and degradation.	Variety of electrolytes with molarity > 10 mM. Applied voltage need to be adjusted to have a current >120 nA and a stable baseline. Membrane surface potential need to be known or estimated.	Variety of electrolytes inert to glass, steel and rubber; sample conductivities 0.005 mS/cm to 5 mS/cm.

Table S2. *ζ*-potential values of plain silica measured by z-PTA.

Medium	time	ζ-potential (mV)
150 mM Tris-HCl	0 h	-21 ± 1
	24 h	-21 ± 2