

Supporting Information

Poly(ethylene oxide) grafted silica nanoparticles: efficient routes of synthesis with associated colloidal stability

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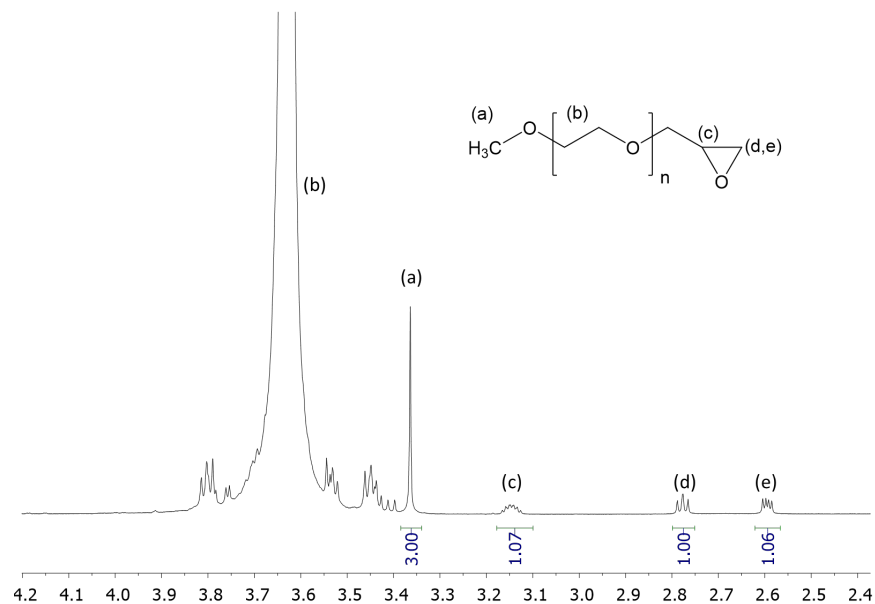


Figure S1. ¹H NMR spectrum of α-methoxy-ω-epoxy poly(ethylene oxide) of 5000 g mol⁻¹ in CDCl₃.

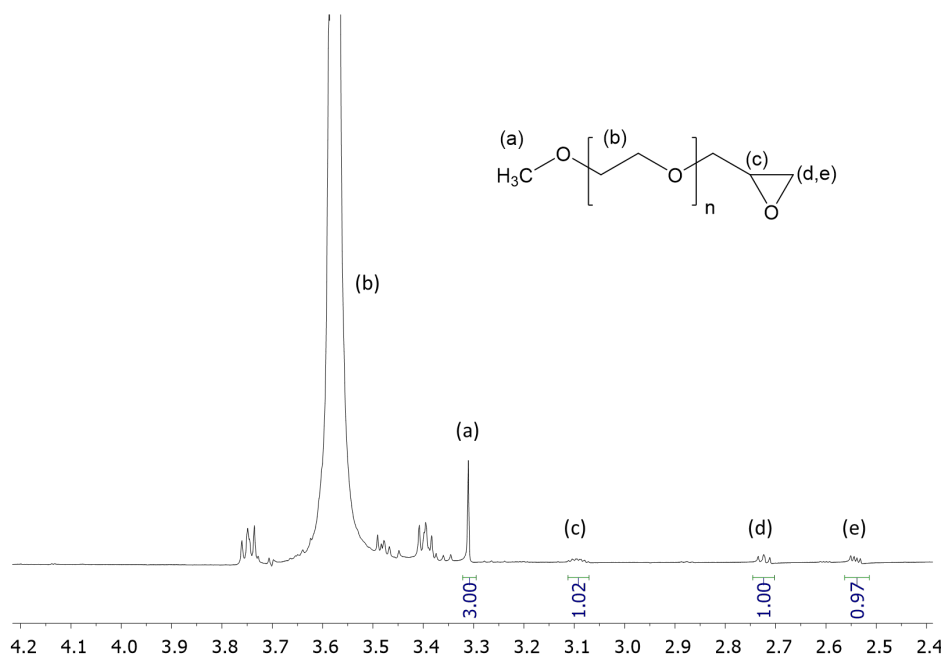


Figure S2. ¹H NMR spectrum of α-methoxy-ω-epoxy poly(ethylene oxide) of 10000 g mol⁻¹ in CDCl₃.

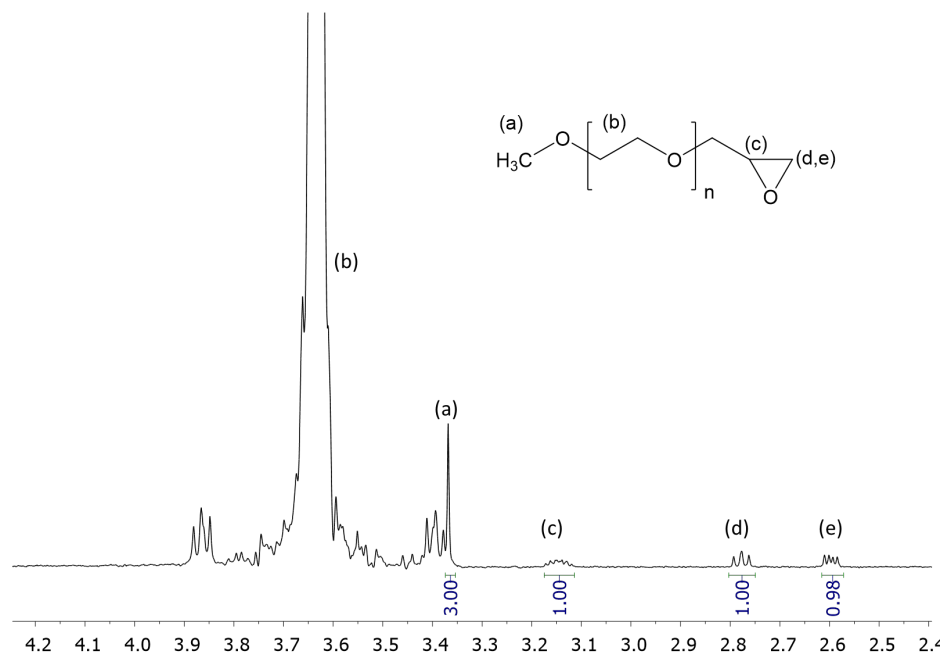


Figure S3. ¹H NMR spectrum of α-methoxy-ω-epoxy poly(ethylene oxide) of 20000 g mol⁻¹ in CDCl₃.

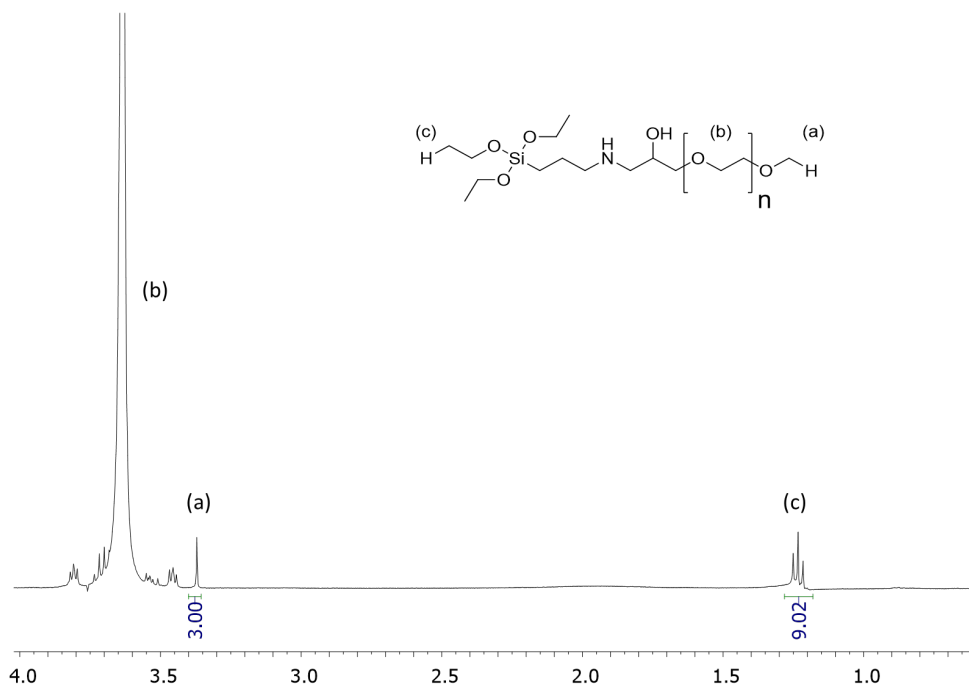


Figure S4. ¹H NMR spectrum of α-methoxy-ω-triethoxysilane poly(ethylene oxide) of 10000 g mol⁻¹ in CDCl₃.

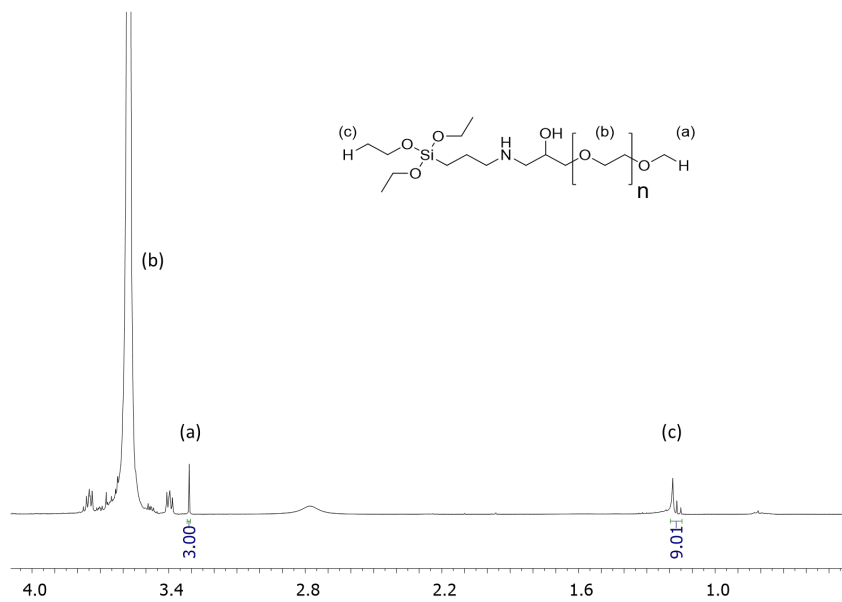


Figure S5. ^1H NMR spectrum of α -methoxy- ω -triethoxysilane poly(ethylene oxide) of 20000 g mol^{-1} in CDCl_3 .

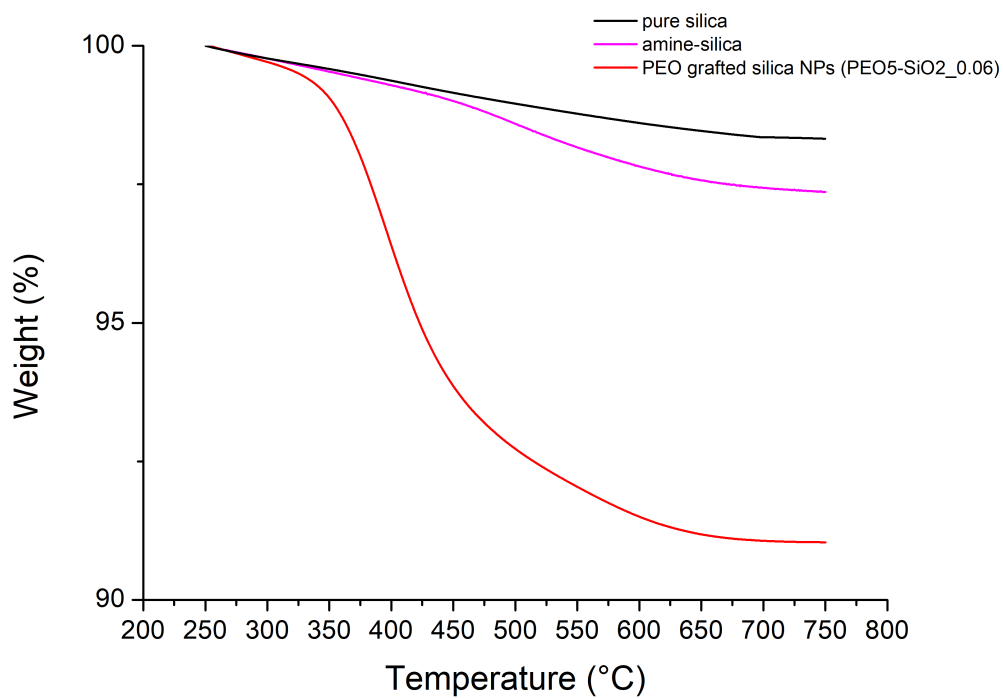


Figure S6. TGA curves of unmodified silica (black), amine-silica (pink) and PEO-grafted silica (red).

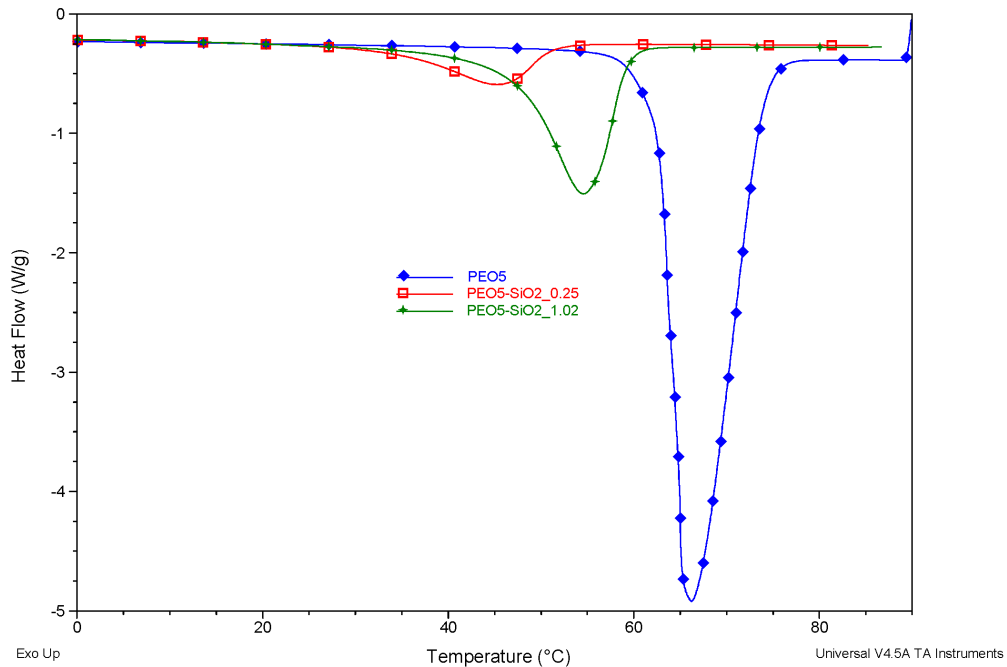


Figure S7. DSC heating traces, recording at a heating rate of $10\text{ }^{\circ}\text{C min}^{-1}$ of PEO of 5000 g mol^{-1} grafted silica nanoparticle series: raw PEO of 5000 g mol^{-1} (\blacklozenge); PEO5-SiO₂_0.25 (\square); PEO5-SiO₂_1.02(\blacktriangledown).

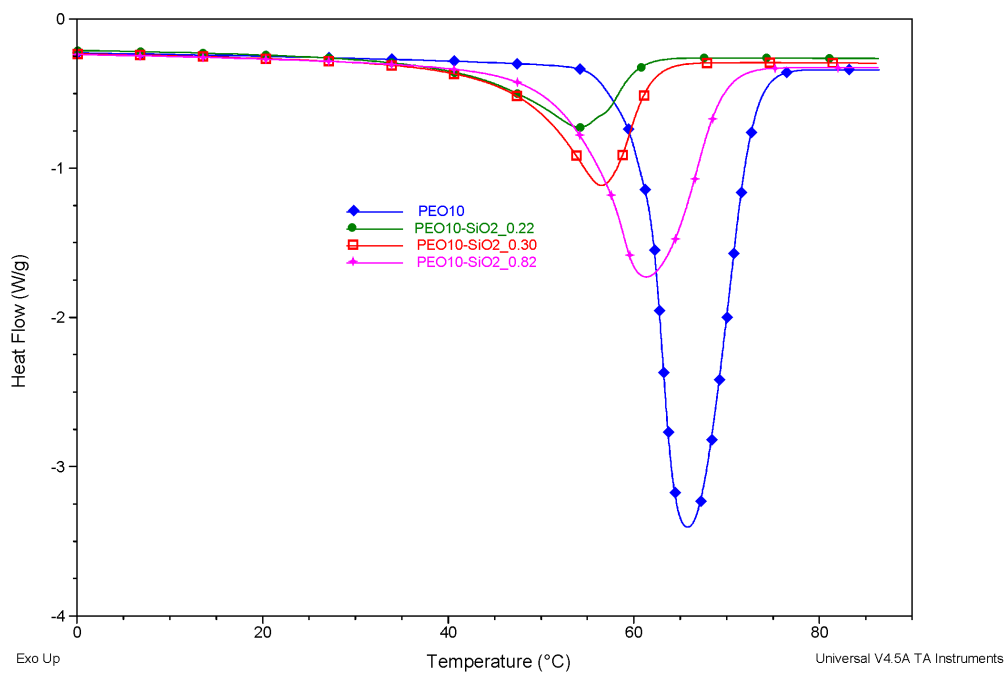


Figure S8. DSC heating traces, recording at a heating rate of $10\text{ }^{\circ}\text{C min}^{-1}$ of PEO of 10000 g mol^{-1} grafted silica nanoparticles series: raw PEO of 10000 g mol^{-1} (\blacklozenge); PEO10-SiO₂_0.22 (\bullet); PEO10-SiO₂_0.30 (\square); PEO10-SiO₂_0.82 (\blackplus).

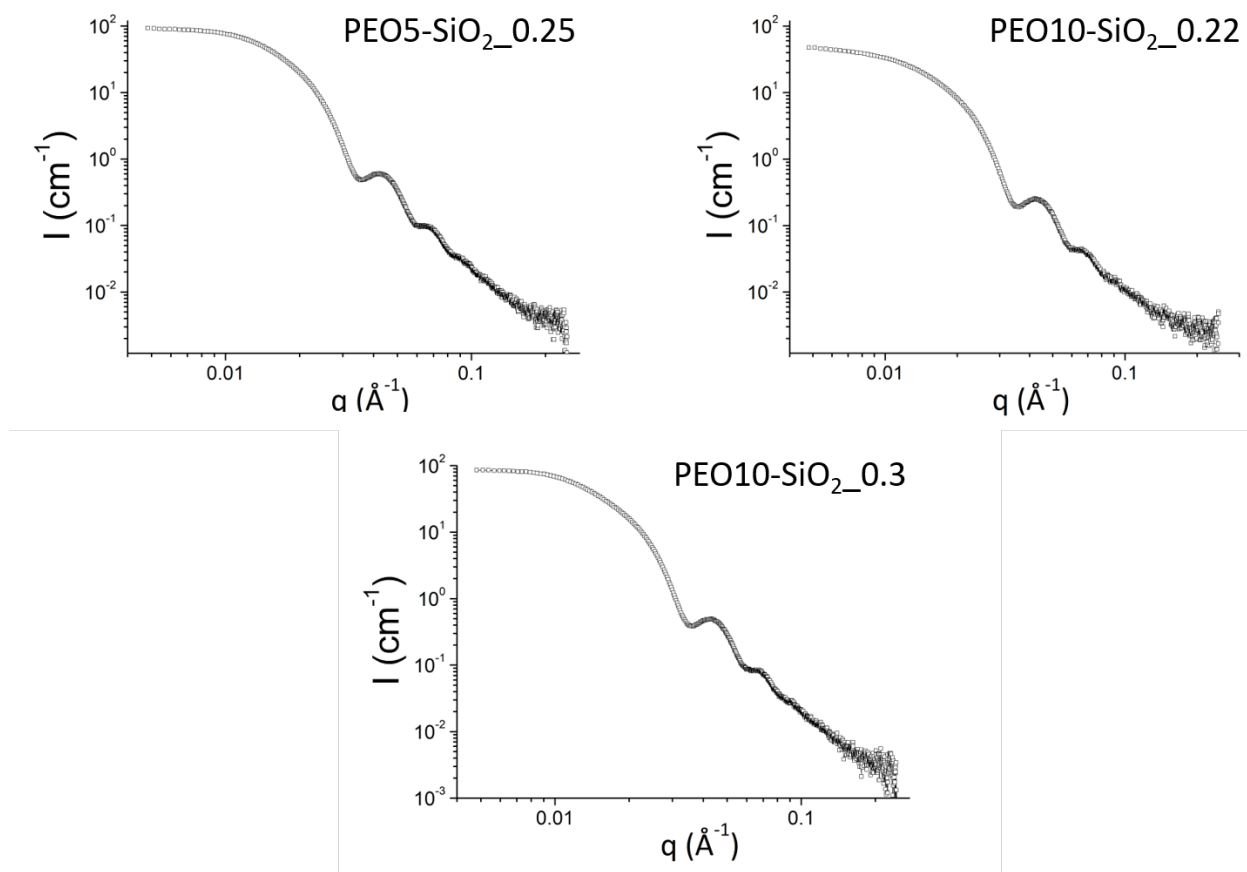


Figure S9: Scattering intensities obtained by SAXS for MPEO of 5000, 10000 g mol^{-1} grafted onto the silica NPs in DMAc at different grafting densities.

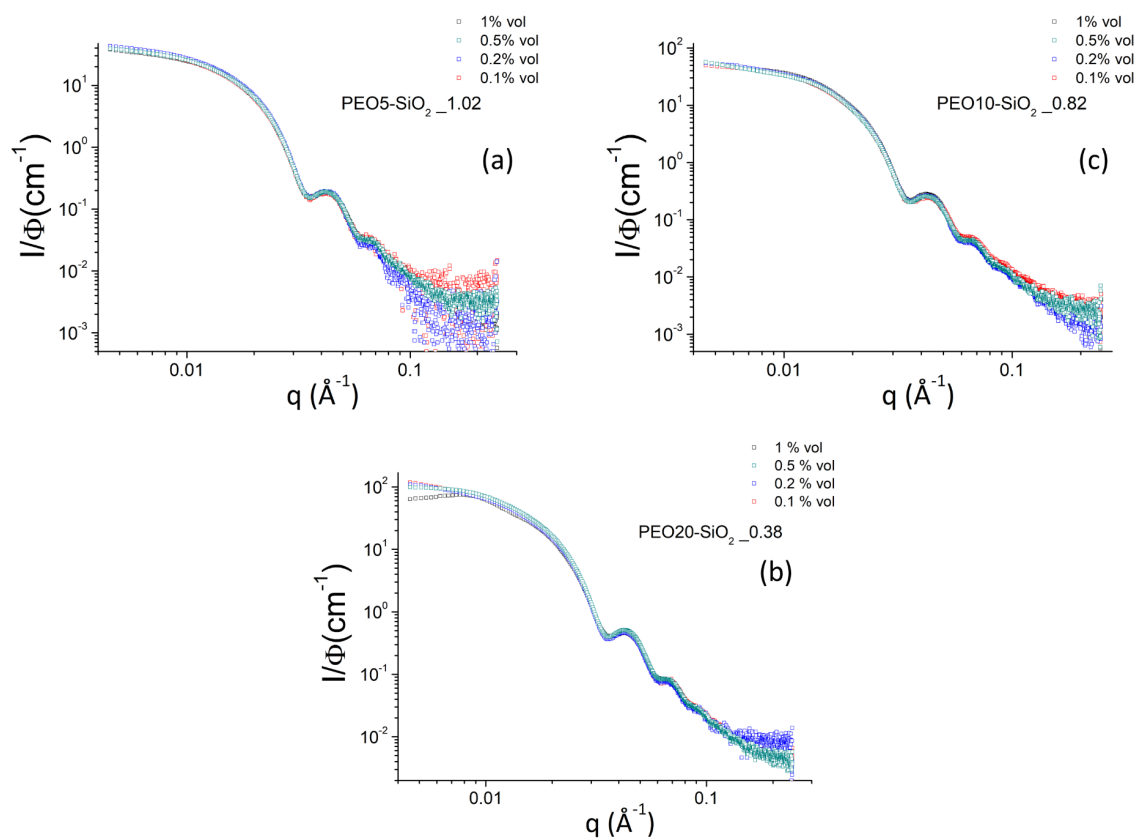


Figure S10. (a) - (c) Scattering intensities obtained by SAXS for MPEO of 5000, 10000 and 20000 $\text{g}\cdot\text{mol}^{-1}$ grafted onto silica NPs in DMAc at different nanoparticle volume fraction. The scattering intensities are normalized by the corresponding nanoparticle volume fraction.

Table S1. Nanoparticles mean distances calculated by either the position of the correlation peak ($2\pi/q^*$; with q^* the position of the correlation peak) or the volume fraction ($(2R_0) (\pi/6\Phi)^{1/3}$) for a series of MPEO of 5000 g mol^{-1} grafted onto the silica NPs in DMAc at different grafting densities. The grafting was performed according to protocol 1.

Sample	Φ	$q^* (\text{\AA}^{-1})$	$d_{\text{mean}} (2\pi/q^*) (\text{\AA})$	$d_{\text{mean}} (2R_0) (\pi/6\Phi)^{1/3} (\text{\AA})$
PEO5-SiO ₂ _0.06	0.017	0.0091	690	815.0
PEO5-SiO ₂ _0.09	0.020	0.0085	739	772.0
PEO5-SiO ₂ _0.12	0.028	0.0108	582	690