

Supporting Information For:

Stopped-flow kinetics of pH-responsive polyamine latexes:

how fast is the latex-to-microgel transition?

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Latex synthesis details

Poly(2-vinylpyridine) latex synthesis via aqueous emulsion polymerization. PEGMA stabilizer (0.45 g of a 50 wt % aqueous solution) and the cationic Aliquat 336 surfactant (0.075 g) were weighed into a 100 mL round-bottomed flask, to which deionized water (39.475 g) was added. DVB (0.025 g) was added to 2VP (2.475 g) and this comonomer mixture was added to the flask. The flask was sealed and the solution was repeatedly degassed via five vacuum/nitrogen cycles. The flask was maintained under a positive nitrogen flow and was heated to 60 °C with the aid of an oil bath and stirred at 250 rpm using a magnetic flea. After 15 minutes, the appropriate amount of AIBA initiator (25.0 mg) dissolved in deionized water (5.0 g) was then injected into the reaction vessel to initiate the copolymerization. The reaction solution gradually turned milky-white within 30 minutes and was stirred at 60 °C for 24 h.

Poly(2-(tert-butylamino)ethyl methacrylate) latex synthesis via aqueous emulsion polymerization. PEGMA stabilizer (1.00 g of a 50 wt % aqueous solution) was weighed into a 100 mL two-neck round-bottomed flask equipped with a magnetic follower. Deionized water (40.0 g) was added, followed by TBAEMA “head monomer” (0.50 g) and the initial solution pH was recorded. This emulsion was purged with nitrogen gas for 15 minutes, then heated to 70 °C with the aid of an oil bath and stirred at 250 rpm using a magnetic flea. After 10 minutes, APS initiator (2.0 wt % based on TBAEMA) dissolved in deionized water (5.0 g) was injected into the reaction vessel to commence the first-stage polymerization. After 1 h, further TBAEMA monomer (4.45 g) pre-mixed with DVB (0.05 g) was added dropwise (3.0 ml h⁻¹) using a syringe pump. The reaction mixture gradually turned milky-white within 30 minutes and was stirred at 70 °C for 24 h.

Poly(2-(diethylamino)ethyl methacrylate) latex synthesis via aqueous emulsion polymerization. PEGMA stabilizer (1.0 g of a 50 wt % aqueous solution) was weighed into a 100 mL round-bottomed flask, to which deionized water (40 g) was added. DVB (0.05 g) was

added to DEA (4.95 g) and this comonomer mixture was added to the flask. The flask was sealed and the reaction solution was repeatedly degassed via five vacuum/nitrogen cycles. The flask was maintained under a positive nitrogen flow, heated to 70 °C with the aid of an oil bath and stirred at 250 rpm using a magnetic flea. After 15 minutes, APS initiator (0.05 g) dissolved in deionized water (5.0 g) was then injected into the reaction vessel to initiate polymerization. The reaction mixture gradually turned milky-white within 30 minutes and was stirred at 70 °C for 24 h.

Figure S1. Representative TEM images obtained for lightly cross-linked PEGMA-stabilised particles; (a) 205 nm P2VP latex (entry 1, Table 1), (b) 210 nm PTBAEMA latex (entry 2, Table 1), (c) 220 nm PDEA latex (entry 3, Table 1), and (d) 210 nm PDPA latex (entry 4, Table 1).

