**Supplementary Data II**

**Poly(N-[3-(dimethylamino)propyl]methacrylamide) (7):** Commercially available monomer N-[3-(dimethylamino)propyl]methacrylamide *DMAPMA* was washed with 1% NaOH aqueous solution, and then distillated under vacuum in presence of small amount of hydroquinone as inhibitor. The homopolymerization of the purified *DMAPMA* was carried out using 2,2’-azobisisobutyronitrile (AIBN) as free radical initiator and dry THF as solvent. The reaction components (500 mg, (2.94 mmol) of DMAPMA and 9.2 mg of AIBN (2 weight %) in ~84 ml Dry THF) were introduced in a 250 ml two-necked flask submitted to three freeze-throw cycles and heated at 65 °C for 24 hrs. The polymerization was stopped by pouring the reaction mixture into a large excess of acetone/hexane solution (1:2). The precipitated polymer was filtered off, re-dissolved in THF and isolated in the acetone/hexane solution. The purification step was repeated 3 times, and then the polymer was dried under high vacuum to give white powder (7) (460 mg, 90% yield).

Low molecular weight polymer was separated from the polydisperse sample, using a dialysis sack which cuts off polymers with molecular weight below 12 000 Dalton. Dialysis was performed in water for 1 day. The polymer was characterized by $^1$H NMR and FTIR.

$^1$H NMR (CDCl$_3$) δ (ppm) = 3.1-3.3 (br, -CON-CH$_2$-), 2.1 (s, CH$_3$-N-CH$_3$), 1.5-1.7 (br, -CH$_2$- backbone and CON-CH$_2$-CH$_2$-), 0.9-1.0 (br, -CH$_3$ backbone).

FTIR ν (cm$^{-1}$) = 3349 (N-H str.), 2942, 2823 (C-H str.), 1690 (C=O amide str.), 1140 (C=N str.)