Liposomes Remain Intact When Complexed with Polycationic Brushes

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Supporting Information

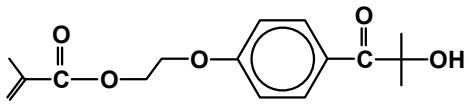
Synthesis of anionic liposomes

Small unilamellar anionic liposomes 40-60 nm in diameter were prepared by the following procedure. The corresponding amounts of El and CL^{2-} solutions in methanol were mixed in a flask. Then the solvent was evaporated under vacuum. Thin layer of lipid mixture was dispersed in a borate buffer, pH 9.2, 10^{-2}M, with a 4700 *Cole-Parmer* ultrasonic homogenizer for 400 s at 20°C. Liposome samples thus obtained were separated from titanium dust by centrifugation for 5 min at 10,000 rpm and used within one day.

Synthesis of spherical polycationic brushes (SPBs)

In the first step 7.98 g of cationic CTAB was dissolved in 1240 ml deionized water under stirring. When 312 g of styrene was added, the reactor was degassed under vacuum and filled by nitrogen for five times. The emulsion polymerization was started by adding 0.91 g of a cationic thermal initiator V50 which was dissolved in 20 ml deionized water at the temperature of 65 °C. The reaction lasted for 120 minutes at 65 °C under 300 rpm stirring. Afterwards, 17.52 g of HMEM (2 mol% of the used styrene) dissolved in 20 ml acetone was added using a dosing motor under starved condition (about 0.2 ml/min) at 65 °C to obtain a well-defined thin layer of photoinitiator on the poly(styrene) core. Finally, UV/vis radiation was used to generate radicals on the surface of the particles. The polystyrene core particles modified with a thin layer of HMEM were filled in an UV-reactor (volume: 2000-3000mL, range of wavelengths: 200-600nm) and diluted to the weight concentration of 2.5 wt% with water. The total volume of particles was adjusted to about 2500 mL. Then defined amounts of monomer, 2-(acryloyloxy)ethyl) trimethylammonium chloride (30 mol% of polystyrene), were added under vigorous stirring. Photo-polymerization was performed by means of UV/Vis-radiation at 15 °C. Strong stirring ensured homogenization of particles in UV-reactor. The photo-emulsion polymerization was finished within 30 minutes. After that, SPB particles were filtered over glass wool to remove possible coagulum. In this way a

dense layer of cationic polyelectrolyte chains was generated on the particle surface by a grafting-from technique.



HMEM