Supplementary Material (ESI) for Chemical Communications

Supplementary Material

Photoinitiated synthesis of polymer brush from dendritic photoinitiator electrostatic self-assembly

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Materials.

Methyl methacrylate (MMA) was washed with 5% aqueous NaOH solution, dried over anhydrous Na_2CO_3 and distilled. Water used in the experiment is Milli-Q deionized water (18 MΩ). Quartz slides (bought from Chinese Medicine Group) were used as substrates for film deposition. Substrates were prepared by immersion in a 30:70 H_2O_2 (30%)/H_2SO_4 (98%) mixture for 1 h at 80□ (piranha etch). Following this treatment, substrates were rinsed in the water to wash any remaining etch solution off, then immersed in a hot H_2O-H_2O_2-NH_3 (5:1:1) mixture at 60□ for 1 h. Afterwards, the substrates were carefully store in water.

DAB-64-TX layer by electrostatic self-assembly

The quartz slides were immersed for 2h in a 1×10^{-3} mol*L^{-1} DAB-64-TX aqueous solution at room temperature to adsorb DAB-64-TX layer on the both sides of the surface, then the quartz slides were rinsed with water three times. Afterwards, the

quartz slides were dried with a stream of N_2 for photoinitiated polymerization of MMA.

Polymer brush by photoinitiated polymerization of MMA

The quartz slides were immersed in MMA/toluene (v/v is 1:1) in a tube, which is placed in a thermostatic bath to maintain 30□. The tube was irradiated for 12h by a 400W high-pressure Hg lamp, set at a distance of 40cm from the sample. After the reaction, the substrates were rinsed with toluene and then extracted with a water-cooled Soxhlet extrator by using toluene as solvent for 12h to completely remove the residual physisorbed polymer. Then the substrates were dried with a stream of N_2.

Analysis

Ellipsometry□The film thickness was obtained with an V-Vase (USA. J. A. Woollam) imaging ellipsometer.

UV-vis spectra□UV-vis spectra were recorded by Perkin-Elmer Lambda 20 UV-vis spectrophotometer.

AFM□The surface morphologies of samples were acquired in tap mode on AFM (Nanoscope□, Digital instruments, USA).

XPS: XPS experiments were carried out on a PHI-5000C ESCA system (Perkin Elmer) with Al Ka radiation (hn=1486.6 eV). In general, the X-ray anode was run at 250W and the high voltage was kept at 14.0 kV with a detection angle at 54°. The pass energy was fixed at 46.95 eV to ensure sufficient sensitivity. The base pressure of the analyzer

chamber was about 5×10^{-8} Pa. The sample was directly pressed to a self-supported disk (10×10mm) and mounted on a sample holder then transferred into the analyzer chamber. The whole spectra (0~1200eV) and the narrow spectra of all the elements with much high resolution were both recorded. Binding energies were calibrated by using the containment carbon (C1s = 284.6eV).

GPC: Molecular weights were determined by gel permeation chromatography (GPC) on a Perkin Elmer Series 200 apparatus on the basis of linear polystyrene standards using THF as eluent.