Supplementary Material (ESI) for Chemical Communications

Experimental

Polymerization

To the aqueous gel solution of ODMG, 5% solution (0.128M) was added butyl acrylate, 12.5g (0.976M) of butyl acrylate, and 1% potassium persulfate (on the weight of monomers), and polymerized for a period of 16hrs at a temperature of 80°C under inert atmosphere. The copolymer was isolated using methanol as a precipitating solvent and further taken up for characterization. In this example the comonomers, BA and ODMG in the feed are in the ratio of 0.88: 0.12m. The copolymerisation reaction using comonomers in feed ratio of 0.74: 0.26 was performed under same conditions, wherein, the concentration of ODMG was maintained at 0.128M.

Solution copolymerisation reactions using the same mole fraction ratio of comonomers were performed under similar using THF and AIBN initiaor in order to ascertain the possible merrits of aqueous emulsion copoymeristion reactions. It was significant to note that such reactions resulted in a very poor yield - as low as about 2%. Therefore, we chose to perform solution polymerisation reactions through photo-irradiation at λ 365 nm and 0.1% AIBN initiator under inert atmosphere, wherein much better yield of about 70% of the polymers was obtained. Two sets of solution polymerizations for the same compositions of comonomers as detailed above were performed in THF solvent on Heber multilamp photoreactor, (model HML-compact – LP – MP – 812) at λ 365 nm from 8W medium pressure UV lamp, under inert atmosphere. Here, 0.1% AIBN was used as initiator. The conditions for solution polymeristion reactions to achieve yield of *ca* 70% have been identified after several experiments.

NMR: ^{1}H NMR measurements were performed on a JEOL ECA 500 NMR spectrograph. For characterization and copolymer composition, $CDCl_3$ solvent and tetramethylsilane d internal standard were used.
In variable temperature NMR measurements on hydrogel, 1% ODMG gel in D_2O was used and measurements were performed at the temperatures of 30, 40, 50, 60, 70^{o}C.

FT-IR: The FT-IR spectrum of the freeze dried gel was measured on Perkin-Elmer RX1 Infra Red spectrometer using KBr pellet method.

XRD: Powder XRD pattern was measured by STOE powder diffraction system using monochromated Cukα (40kv, 30mA) radiation in 2θ range of 1 to 10 degrees.

SEM: SEM photograph of the dried gel was taken using JEOL 840 Scanning Electron Microscopy. Samples were prepared by air-drying on a SEM stub for about 5 days followed by gold coating to minimize charge.

Particle size and Zeta potential: The particle size and zeta potential of the polymerized latexes were measured using Malvern particle size analyzer 1000HS/3000HS at a fixed scattering angle of 90°.

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GPC: The molecular weight estimations were carried out on a JASCO GPC chromatograph Model MX-2080-31 fitted with PL gel 5µm Mixed-C columns, 300 x 7.5mm, in THF with a flow rate of 1mL min^{-1} at 30^{o}C using RI detector.