Electronic Supplementary Material (ESI) for RSC Advances.

Electronic Supplementary Information

Nano-capsules of amphiphilic poly (ethylene glycol)-block-poly (bisphenol A carbonate) copolymers via thermodynamic entrapment

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Contact Angle Measurement

The polycarbonate (PC) and PEG-b-PC materials were pressed into a thin flat and smooth film and static contact angles were measured using a CAM101/KSV contact angle system using DI water as a probe liquid.

Figure S1. Contact angle of the polycarbonate starting materials (top) and PEG-*b*-PC copolymer (bottom).

Heteronuclear multiple-bond correlation spectroscopy (2D-HMBC) NMR.

2D NMR spectra were measured on a Jeol Eclipse JNM-EX400 MHz spectrometer as. All spectra were collected at room temperature using the residual proton resonance of the $CDCl_3$ as the internal standard. Proton signals reported as chemical shift σ (ppm).

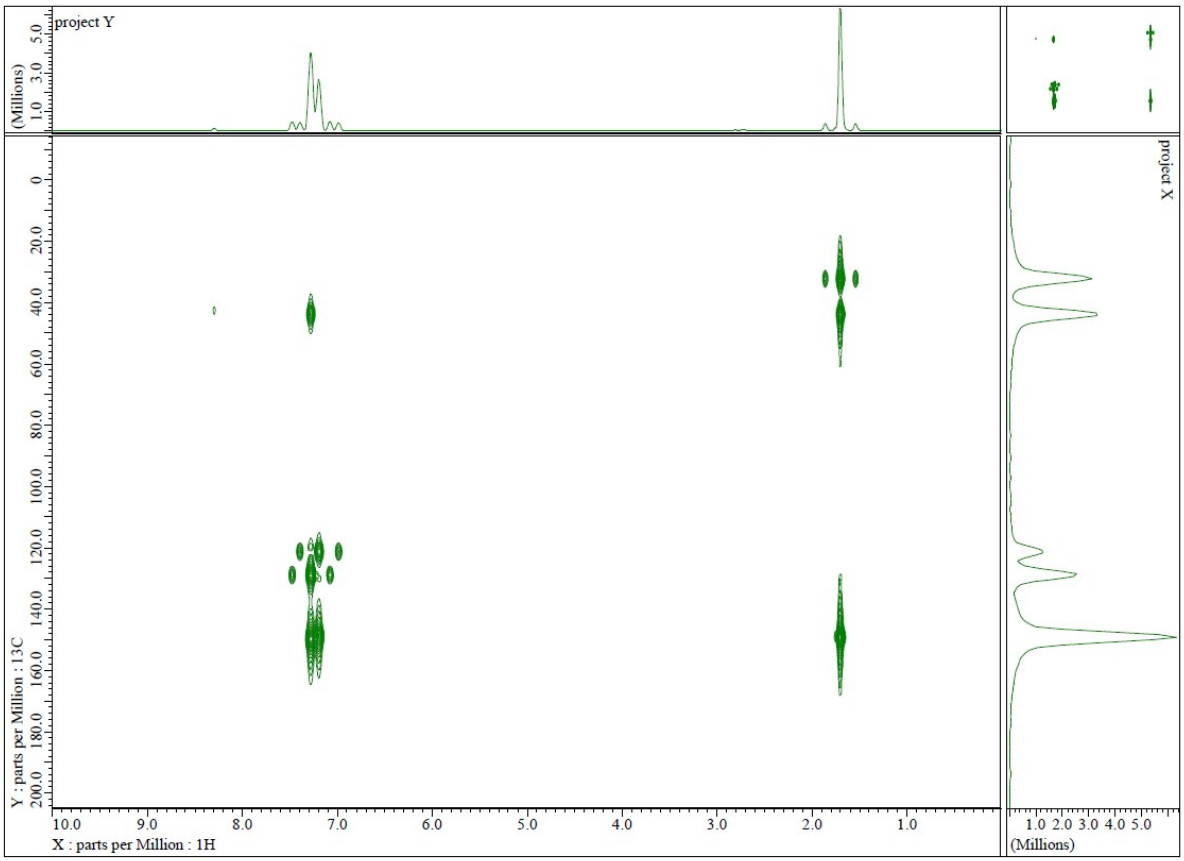

Figure S2. GMHBC 2D data of the PC starting material.

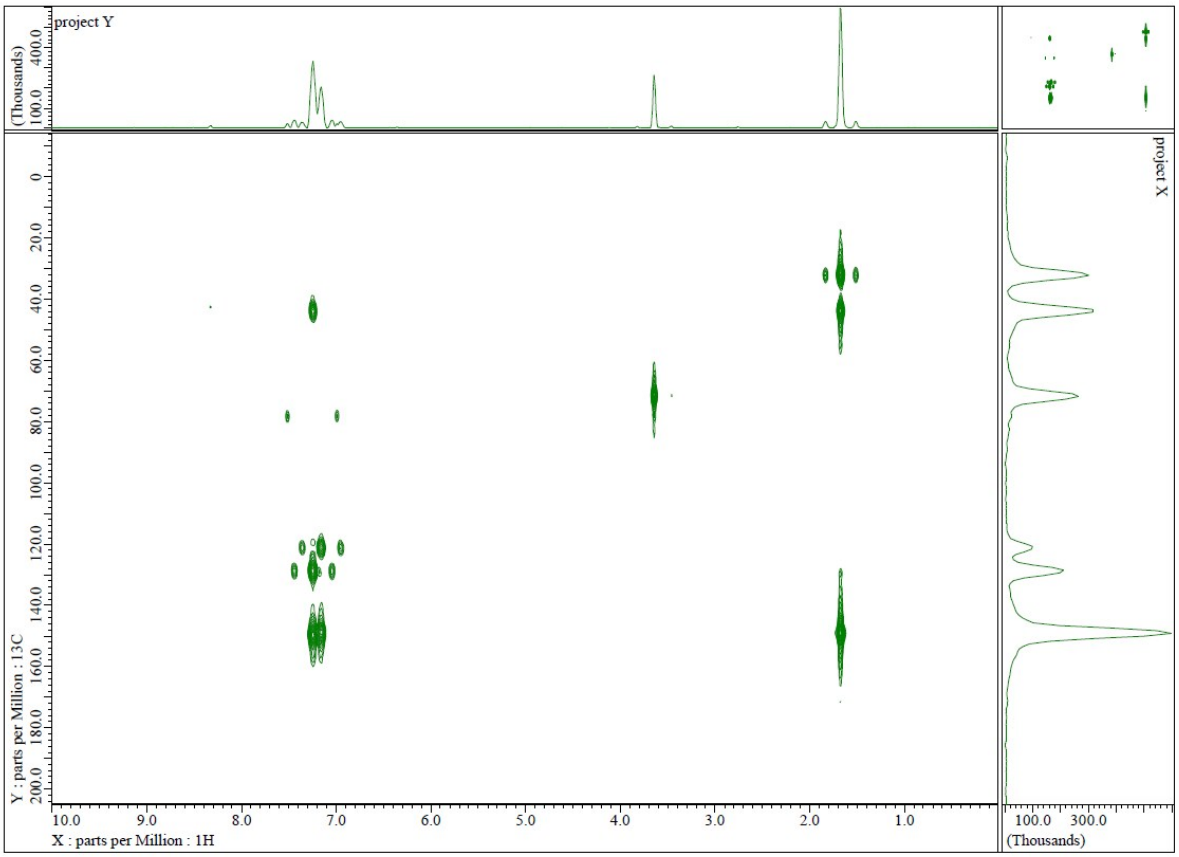

Figure S3. GMHBC 2D data of PEG-*b*-PC block copolymer.

Conventional and Modulated Differential Scanning Calorimetry (DSC)

The dynamic DSC scan of the polycarbonate starting material displayed a glass transition at -150°C with no melting (i.e. amorphous material).

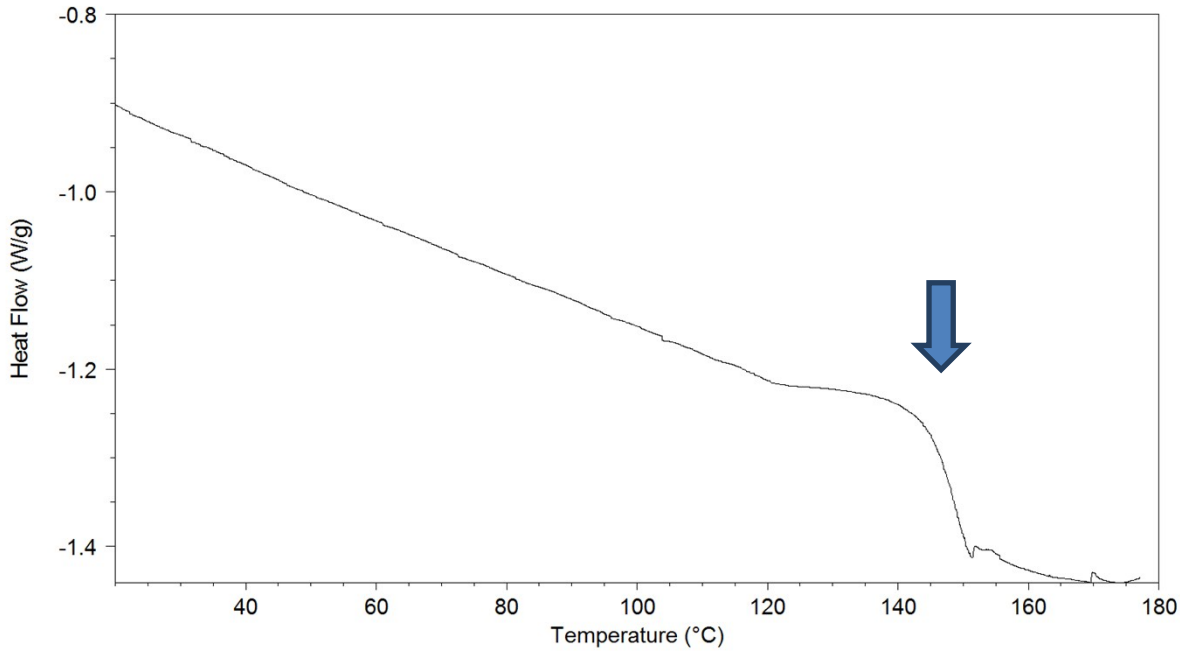

Figure S4. DSC trace (conventional mode) of the PC starting material.

The polyethylene glycol displayed a melting point at 63.5 °C using conventional DSC.

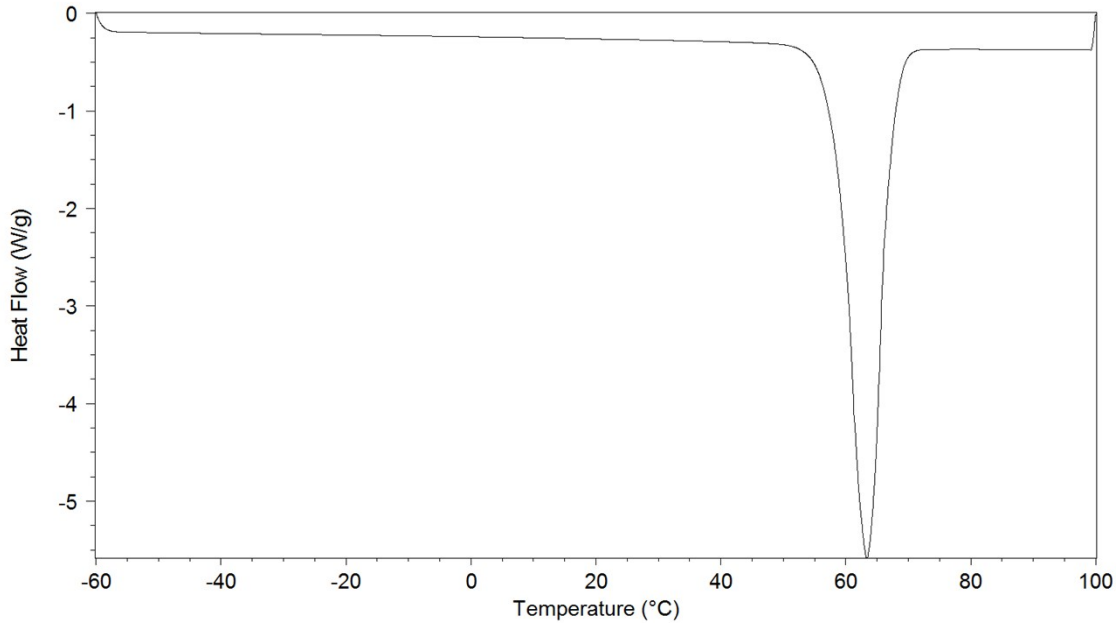

Figure S5. DSC trace (conventional mode) of the mPEG-OH starting material.

The glass transition of the polyethylene glycol could not be captured in conventional mode (using various heating and cooling rates) but in modulated mode, a glass transition at -21.5°C was observed.

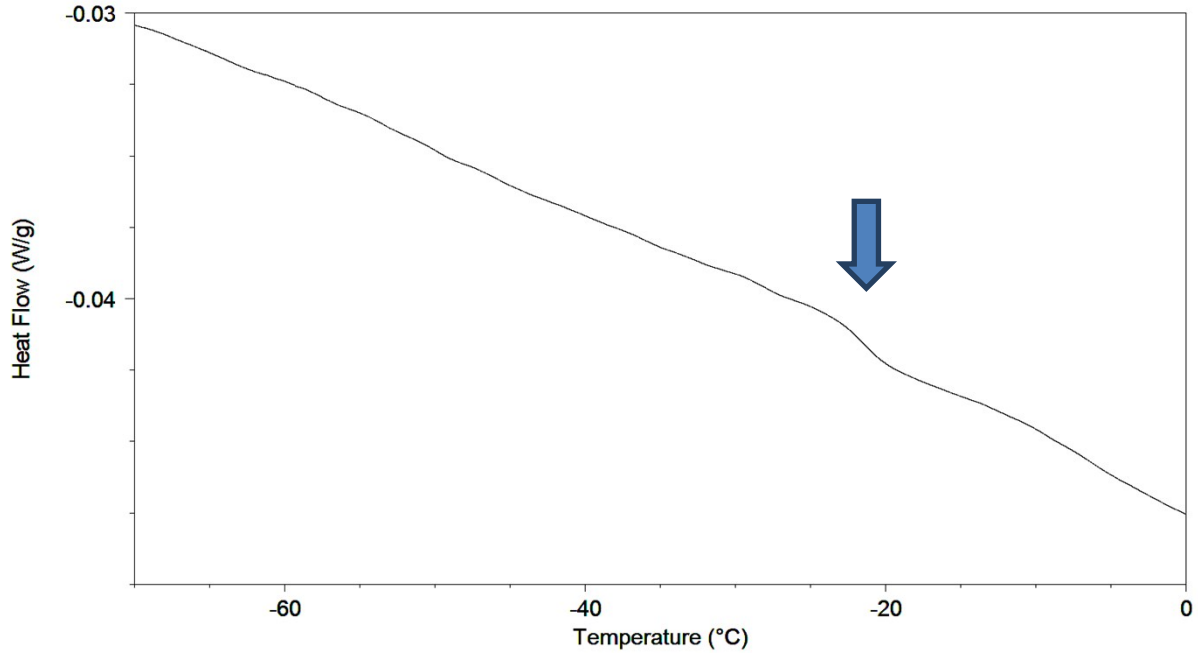

Figure S6. DSC trace (modulated mode) of the mPEG-OH starting material.

Dynamic Light Scattering (DLS)

Self-assembly analysis in solution was carried out using a Malvern Zetasizer Nano ZS spectrometer equipped with 4mW He-Ne laser (emission 633nm). All measurements were carried out at 25 °C using non-invasive backscatter (NIBS) optics with a detection angle of 173°. Analysis was performed using 50 mg of block copolymer dissolved in 1.5 ml of THF. The sample was first ultrasonicated and then filtered through a syringe filter (0.45 µm pore size) prior to measurement. The size distribution histogram reported in this paper are the z-average diameters measured by the instrument using cumulative analysis.

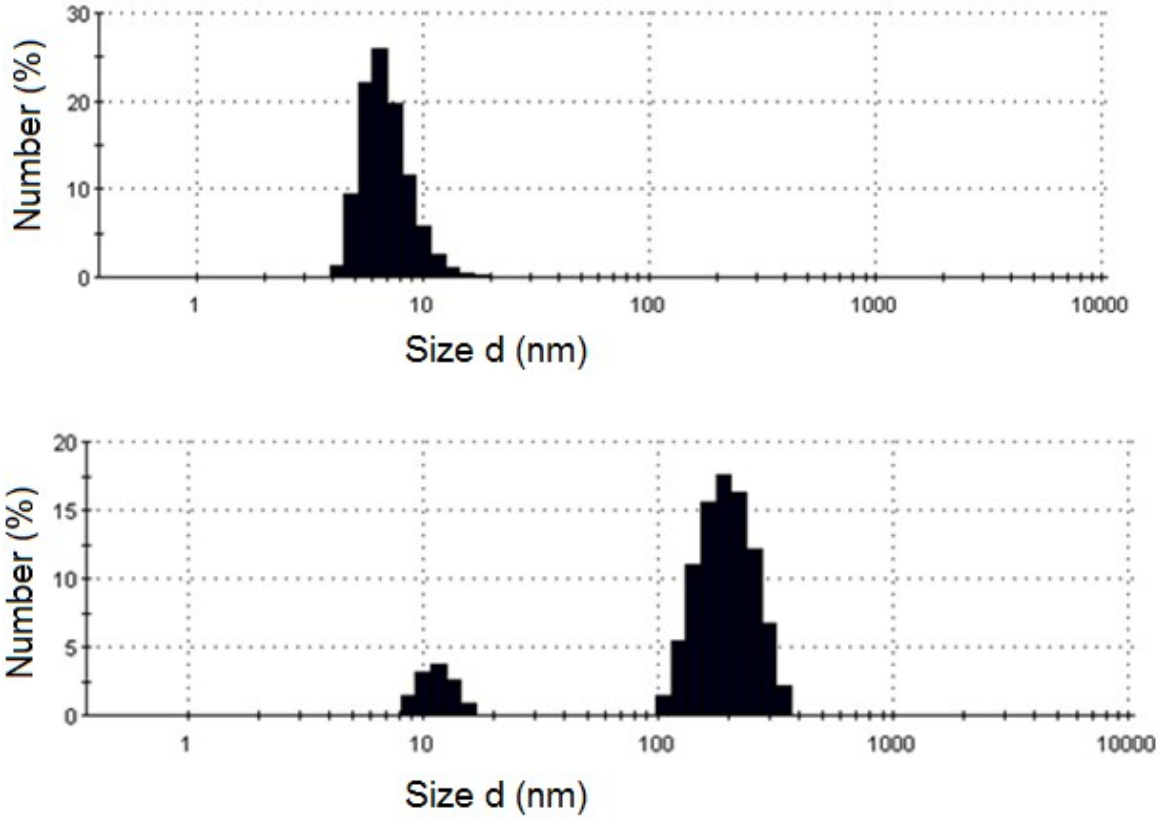

Figure S7. DLS histograms of PEG-*b*-PC copolymer in THF after ultrasonication (top) and after a rest period of ~2h (bottom).

Freezing of the morphology – particle size measurement (DLS)

Starting with solution of THF containing 0.5 mg/ml of PEG-*b*-PC copolymer, water was added to yield a 4:1 THF/water volumetric ratio. The particle size measured was ~ 370 nm (mean) with a PDI<0.2. More water was added to reach a 2:3 THF/water volumetric ratio. The particle size measured was ~ 450 nm (mean) with a PDI<0.3. More water was added to reach a 1:4 THF/water volumetric ratio. The particle size measured was ~ 500 nm (mean) with a PDI<0.5.

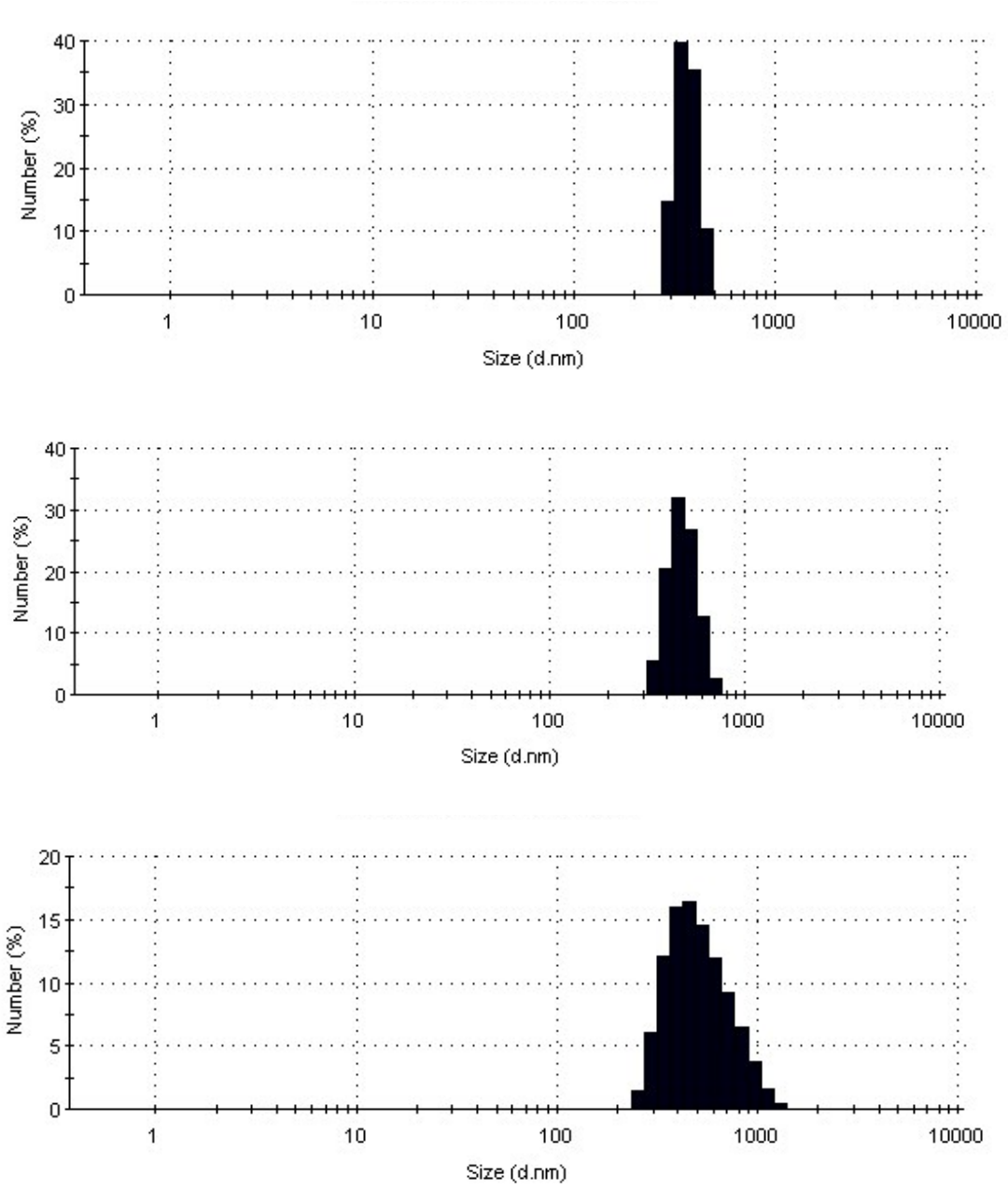

Figure S8. DLS histograms of PEG-*b*-PC copolymer in THF (0.5 mg/ml) after subsequent addition of water to obtain THF/water volumetric ratios of 4:1; 2:3 and 1:4 (top to bottom).