Supporting Information for:

Epoxy-Functional Diblock Copolymer Spheres, Worms and Vesicles via Polymerization-Induced Self-Assembly in Mineral Oil

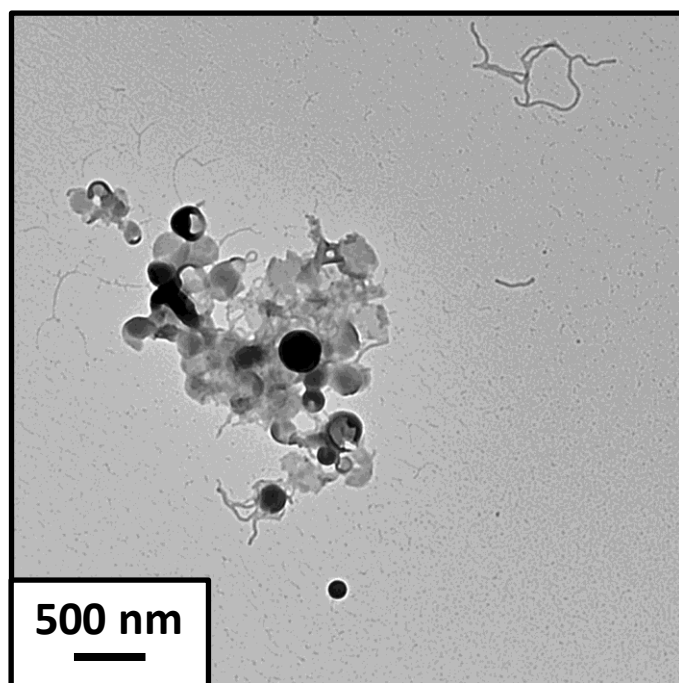*Philip J. Docherty, Chloé Girou, Matthew J. Derry[†,]* and Steven P. Armes**

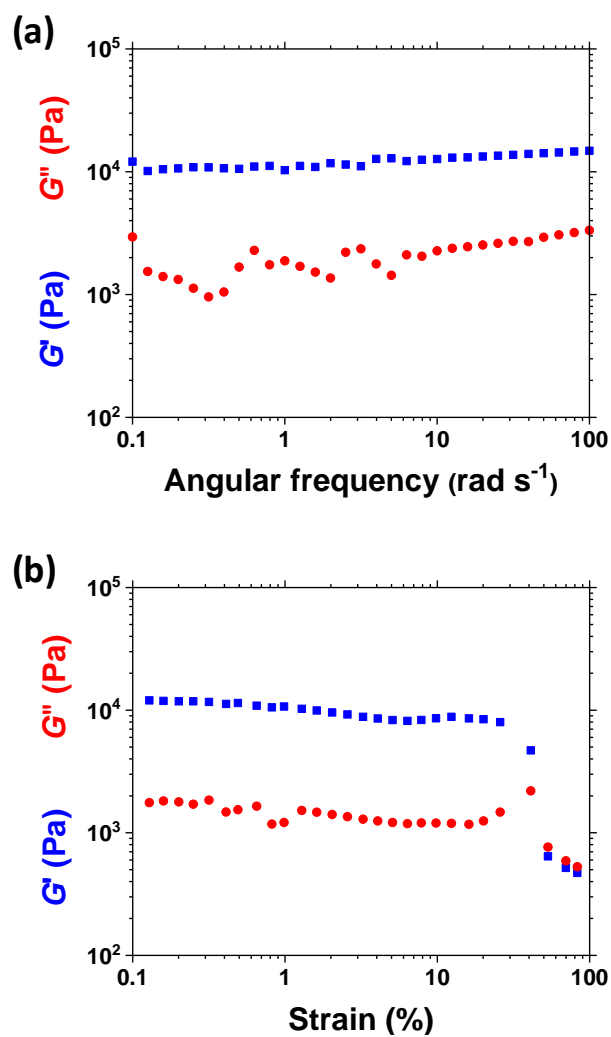**Figure S1.** TEM image recorded for $PSMA_9$-$PGlyMA_{100}$ nano-objects.

Figure S2. Variation of the storage modulus (G') and loss modulus (G'') for a 30% w/w dispersion of PSMA$_9$-PGlyMA$_{75}$ worms in mineral oil during (a) an angular frequency sweep from 0.1 rad s^{-1} to 100 rad s^{-1} at 1.0% strain amplitude and (b) a strain sweep from 0.1% to 100% at an angular frequency of 10 rad s^{-1}.
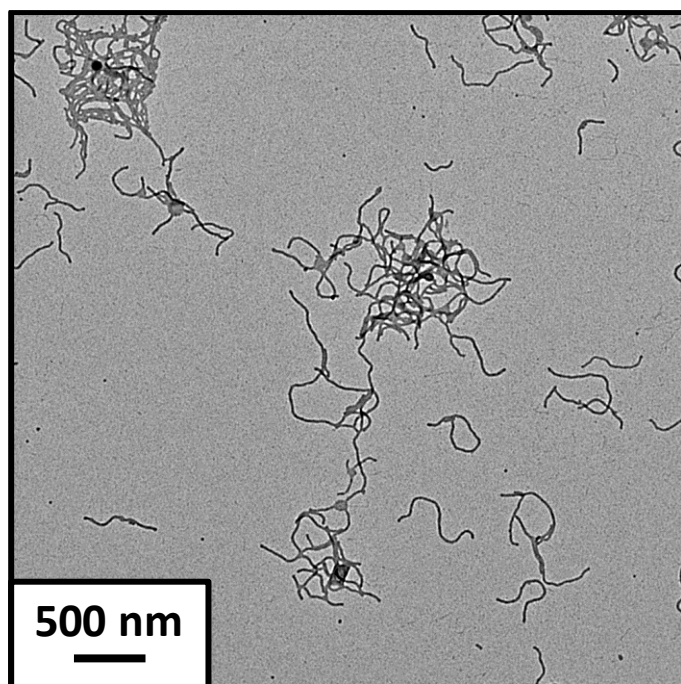
Figure S3. TEM image recorded for PSMA$_9$-PGlyMA$_{75}$ nano-objects obtained at room temperature after an oscillatory rheology temperature sweep (from 25 °C to 100 °C at 2 °C min^{-1}).

SAXS Models

The SAXS models used in this study (for spheres, dimers and trimers,[1] worm-like micelles,[2] and vesicles[3]) have been reported in detail elsewhere.[1, 4] The scattering length densities used for the coronal PSMA (ξ_{PSMA}) and core PGlyMA (ξ_{PGlyMA}) blocks were 9.24 x 10^{10} cm^{-2} and 11.34 x 10^{10} cm^{-2}, respectively, and that for the mineral oil solvent (ξ_{sol}) was 7.63 x 10^{10} cm^{-2}. Throughout the manuscript, the following terms are used and are defined as follows:

$\varphi_{spheres}$ -   volume fraction of spheres

φ_{dimers} -   volume fraction of dimers

$\varphi_{trimers}$ -   volume fraction of trimers

D_{sphere} -   overall diameter of a sphere

            (equal to 2*[spherical core radius] + 4*[stabilizer radius of gyration])

T_{worm} -   overall worm thickness

            (equal to 2*[worm core radius] + 4*[stabilizer radius of gyration])

L_{worm} -   worm length

$T_{membrane}$ -   vesicle membrane thickness

$D_{vesicle}$ -   overall vesicle diameter

            (equal to 2*[distance from the centre of the vesicle to the centre of the membrane] + 4*[stabilizer radius of gyration])

N_{agg} -   aggregation number (or number of copolymer chains per nanoparticle)

Table S1. Summary of fitting parameters and dimensions determined by fitting SAXS patterns recorded for 1.0% w/w dispersions of PSMA$_9$-PGlyMA$_x$ (S$_9$-Gly$_x$) diblock copolymer nanoparticles in mineral oil. Standard deviations for the value of D_{sphere}, T_{worm}, $T_{membrane}$ and $D_{vesicle}$ are also indicated.

Copolymer composition	Sphere, dimer, trimer model[1]				Worm-like micelle model[2]		Vesicle model[3]		N_{agg}
	D_{sphere} (nm)	$\varphi_{spheres}$	φ_{dimers}	$\varphi_{trimers}$	T_{worm} (nm)	L_{worm} (nm)	$T_{membrane}$ (nm)	$D_{vesicle}$ (nm)	
S$_9$-Gly$_{50}$ spheres	17.0 ± 1.3	0.62	0.29	0.09	-	-	-	-	321
S$_9$-Gly$_{75}$ worms	-	-	-	-	18.0 ± 1.6	262.4	-	-	4085
S$_9$-Gly$_{150}$ vesicles	-	-	-	-	-	-	16.1 ± 1.8	136.6 ± 21.5	25524
S$_9$-Gly$_{200}$ vesicles	-	-	-	-	-	-	19.6 ± 1.8	156.5 ± 36.6	30237

References

1. N. J. Warren, O. O. Mykhaylyk, D. Mahmood, A. J. Ryan and S. P. Armes, *Journal of the American Chemical Society*, 2014, **136**, 1023-1033.

2. J. S. Pedersen, *Journal of Applied Crystallography*, 2000, **33**, 637-640.

3. J. Bang, S. M. Jain, Z. B. Li, T. P. Lodge, J. S. Pedersen, E. Kesselman and Y. Talmon, *Macromolecules*, 2006, **39**, 1199-1208.

4. M. J. Derry, L. A. Fielding, N. J. Warren, C. J. Mable, A. J. Smith, O. O. Mykhaylyk and S. P. Armes, *Chemical Science*, 2016, **7**, 5078-5090.