



This is a repository copy of *Semi-crystalline diblock copolymer nano-objects prepared via RAFT alcoholic dispersion polymerization of stearyl methacrylate.*

White Rose Research Online URL for this paper:
<http://eprints.whiterose.ac.uk/95152/>

Version: Supplemental Material

Article:

Semsarilar, M., Penfold, N.J.W., Jones, E.R. et al. (1 more author) (2015) Semi-crystalline diblock copolymer nano-objects prepared via RAFT alcoholic dispersion polymerization of stearyl methacrylate. *Polymer Chemistry*, 6 (10). pp. 1751-1757. ISSN 1759-9954

<https://doi.org/10.1039/c4py01664e>

Reuse

Unless indicated otherwise, fulltext items are protected by copyright with all rights reserved. The copyright exception in section 29 of the Copyright, Designs and Patents Act 1988 allows the making of a single copy solely for the purpose of non-commercial research or private study within the limits of fair dealing. The publisher or other rights-holder may allow further reproduction and re-use of this version - refer to the White Rose Research Online record for this item. Where records identify the publisher as the copyright holder, users can verify any specific terms of use on the publisher's website.

Takedown

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.



eprints@whiterose.ac.uk
<https://eprints.whiterose.ac.uk/>

Semi-Crystalline Diblock Copolymer Nano-Objects Prepared via RAFT**Alcoholic Dispersion Polymerization of Stearyl Methacrylate**

M. Semsarilar, N. J. W. Penfold, E. R. Jones and S. P. Armes*

Table S1. Monomer conversions, intensity-average particle diameters, molecular weight data and copolymer morphologies obtained for PDMA₅₅-PSMA_x diblock copolymer nanoparticles synthesized at solids concentrations of 10-30 % w/w via RAFT alcoholic dispersion polymerization of SMA in ethanol at 70 °C.

solids (%)	target copolymer composition	SMA % conv.	actual SMA DP	GPC		DLS		TEM
				M _n	M _w /M _n	Diameter	PDI	morphology
10	PDMA ₅₅ -PSMA ₂₀	100	20	14 500	1.30	200	1.00	spheres
	PDMA ₅₅ -PSMA ₃₀	97	29	16 400	1.33	759	1.00	spheres
	PDMA ₅₅ -PSMA ₃₅	100	35	18 800	1.31	42	0.11	spheres + worms
	PDMA ₅₅ -PSMA ₄₀	100	40	19 800	1.36	245	1.00	spheres + worms
	PDMA ₅₅ -PSMA ₅₀	100	50	20 500	1.39	114	0.40	spheres + worms
	PDMA ₅₅ -PSMA ₆₀	100	60	22 600	1.44	101	0.47	vesicles
	PDMA ₅₅ -PSMA ₈₀	95	76	27 800	1.42	159	0.48	vesicles
	15	PDMA ₅₅ -PSMA ₃₅	100	35	18 900	1.30	68	0.13
PDMA ₅₅ -PSMA ₄₅		100	45	19 600	1.36	157	0.16	worms + vesicles
PDMA ₅₅ -PSMA ₅₅		100	55	21 100	1.38	160	0.07	worms + vesicles
20	PDMA ₅₅ -PSMA ₂₀	100	20	14 600	1.29	205	1.95	spheres
	PDMA ₅₅ -PSMA ₃₀	100	30	14 800	1.34	54	0.14	spheres + worms
	PDMA ₅₅ -PSMA ₃₅	100	35	19 700	1.33	85	0.14	worms
	PDMA ₅₅ -PSMA ₄₀	100	40	19 200	1.35	170	0.15	worms + vesicles
	PDMA ₅₅ -PSMA ₅₀	100	50	20 200	1.37	143	0.13	worms + vesicles
	PDMA ₅₅ -PSMA ₆₀	100	60	22 400	1.29	233	1.00	vesicles
	PDMA ₅₅ -PSMA ₁₀₀	93	93	28 800	1.49	181	0.06	vesicles
	25	PDMA ₅₅ -PSMA ₃₅	95	33	19 400	1.34	102	0.14
PDMA ₅₅ -PSMA ₄₅		100	45	19 700	1.37	207	0.12	worms + vesicles
30	PDMA ₅₅ -PSMA ₂₀	100	20	14 800	1.27	55	0.84	spheres
	PDMA ₅₅ -PSMA ₃₀	100	30	16 500	1.35	240	0.82	worms + vesicles
	PDMA ₅₅ -PSMA ₄₀	100	40	19 700	1.32	112	0.13	worms + vesicles
	PDMA ₅₅ -PSMA ₅₀	100	50	20 800	1.39	293	0.68	worms + vesicles
	PDMA ₅₅ -PSMA ₆₀	100	60	22 700	1.47	110	0.59	vesicles
	PDMA ₅₅ -PSMA ₈₀	100	80	26 900	1.49	161	0.84	vesicles

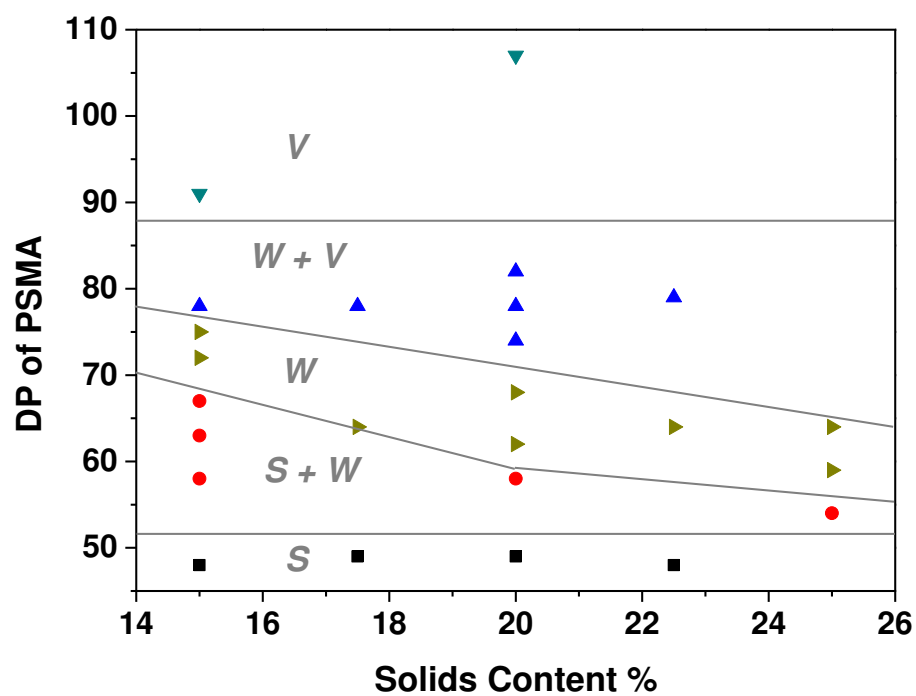


Figure S1. ‘Post-mortem’ phase diagram constructed for a PDMA₆₅-PSMA_x RAFT alcoholic dispersion polymerization formulation by systematic variation of the mean target DP of the core-forming PSMA_x and the total solids concentration.

Table S2. Monomer conversions, intensity-average particle diameters, molecular weight data and copolymer morphologies obtained for PDMA₆₅-PSMA_x diblock copolymer nanoparticles synthesized at solids concentrations of 15-25 % w/w by RAFT alcoholic dispersion polymerization of SMA in ethanol at 70 °C.

solids (%)	target composition	SMA % conv.	actual SMA DP	GPC		DLS		TEM
				M _n	M _w /M _n	diameter	PDI	morphology
15	PDMA ₆₅ -PSMA ₅₀	96	48	17 200	1.20	33	0.07	spheres
	PDMA ₆₅ -PSMA ₆₀	97	58	23 000	1.15	65	0.17	spheres + worms
	PDMA ₆₅ -PSMA ₆₅	97	63	24 600	1.18	73	0.16	spheres + worms
	PDMA ₆₅ -PSMA ₇₀	96	67	23 700	1.13	104	0.25	spheres + worms
	PDMA ₆₅ -PSMA ₇₅	96	72	24 600	1.18	126	0.13	worms
	PDMA ₆₅ -PSMA ₈₀	93	75	27 000	1.22	166	0.31	worms
	PDMA ₆₅ -PSMA ₈₅	92	78	25 800	1.19	149	0.16	worms + vesicles
	PDMA ₆₅ -PSMA ₁₁₀	82	91	29 600	1.24	154	0.05	vesicles
17.5	PDMA ₆₅ -PSMA ₅₀	99	49	21 800	1.24	34	0.12	spheres
	PDMA ₆₅ -PSMA ₇₀	99	64	23 900	1.29	138	0.18	worms
	PDMA ₆₅ -PSMA ₈₅	92	78	23 700	1.21	169	0.12	worms + vesicles
20	PDMA ₆₅ -PSMA ₅₀	98	49	19 700	1.18	37	0.09	spheres
	PDMA ₆₅ -PSMA ₆₀	97	58	23 000	1.15	75	0.18	spheres + worms
	PDMA ₆₅ -PSMA ₆₅	96	62	23 800	1.15	96	0.22	worms
	PDMA ₆₅ -PSMA ₇₀	97	68	24 400	1.16	119	0.19	worms
	PDMA ₆₅ -PSMA ₇₅	99	74	26 000	1.17	130	0.19	worms + vesicles
	PDMA ₆₅ -PSMA ₈₀	97	78	30 000	1.09	149	0.20	worms + vesicles
	PDMA ₆₅ -PSMA ₈₅	97	82	31 100	1.10	140	0.01	worms + vesicles
	PDMA ₆₅ -PSMA ₁₁₀	97	107	33 200	1.20	176	0.05	vesicles
22.5	PDMA ₆₅ -PSMA ₅₀	98	48	20 000	1.26	56	0.23	spheres
	PDMA ₆₅ -PSMA ₆₅	99	64	22 900	1.14	128	0.29	worms
	PDMA ₆₅ -PSMA ₈₅	93	79	23 600	1.26	174	0.08	worms + vesicles
25	PDMA ₆₅ -PSMA ₅₅	99	54	19 600	1.21	76	0.17	spheres + worms
	PDMA ₆₅ -PSMA ₆₀	99	59	20 800	1.16	110	0.21	worms
	PDMA ₆₅ -PSMA ₆₅	99	64	24 000	1.26	136	0.19	worms

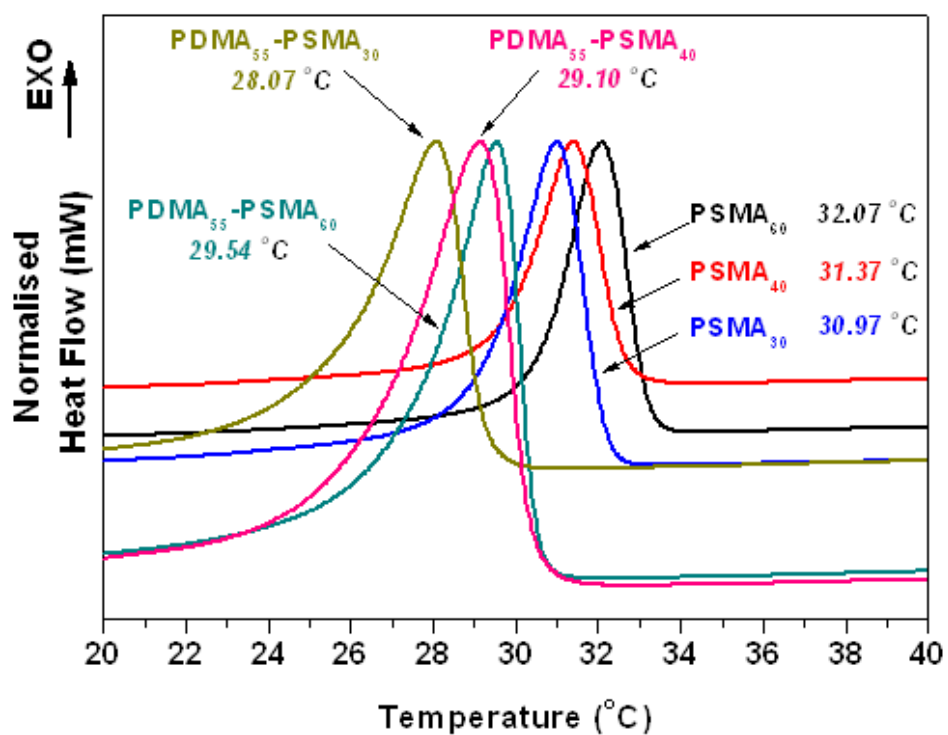


Figure S2. DSC traces obtained for PDMA₅₅-PSMA_x diblock copolymer nano-objects prepared by RAFT alcoholic dispersion polymerization of SMA at 70 °C. The maxima indicate T_m.