Supporting Information for

EMULSION POLYMERIZATION USING IONIC LIQUID C1EG™ AND DTAB AS SURFACTANTS

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Table S1. Conversion and average diameter after 120 min of reaction.

Reaction number	**Repetition**	**Conversion*, %**	**Average* ± Std. Dev.**	**D_p*, nm**	**Average* ± Std. Dev.**
15	a	96.46	96.91 ± 0.63	65.46	66.21 ± 1.05
	b	97.35		66.95	
19	a	95.94	96.42 ± 0.67	58.88	59.24 ± 0.51
	b	96.89		59.60	
21	a	84.59	85.86 ± 1.76	63.72	64.26 ± 1.16
	b	87.87		63.47	
	c	85.11		65.60	
25	a	86.98	89.44 ± 3.47	54.33	53.71 ± 0.88
	b	91.89		53.09	
27	a	97.82	97.60 ± 0.33	71.11	71.49 ± 0.85
	b	97.77		72.47	
	c	97.22		70.90	
28	a	90.52	90.25 ± 0.39	61.23	61.18 ± 0.07
	b	89.97		61.13	
30	a	95.18	95.19 ± 0.01	61.20	60.90 ± 0.42
	b	95.20		60.60	
32	a	92.07	92.11 ± 0.05	54.61	54.27 ± 0.48
	b	92.14		53.93	

34	a	87.71	88.21 ± 0.71	69.70	69.58 ± 0.18
	b	88.71		69.45	
36	a	97.04	94.90 ± 3.03	72.26	72.48 ± 0.31
	b	92.75		72.70	

* Two significant decimal figures are used here. They are rounded to one significant figure in the main manuscript.

Table S2. Effect of surfactant type on conversion and particle diameter for styrene polymerizations.

Monomers	Surfactant	Conversion [%]	PD [nm]
Styrene	**C1EG**	89.7 ± 5.2 **a**	66.3 ± 2.5 **a**
	DTAB	92.0 ± 3.8 **a**	58.0 ± 3.5 **b**

* Different letters indicate significant differences ($p \leq 0.05$). ANOVA and *post hoc* Tukey's test.

Table S3. Effect of surfactant type on conversion and particle diameter for MMA polymerizations.

Monomers	Surfactant	Conversion [%]	PD [nm]
MMA	**C1EG**	96.1 ± 1.9 **a**	68.8 ± 5.4 **a**
	DTAB	92.1 ± 0.1 **b**	54.3 ± 0.5 **b**

* Different letters indicate significant differences ($p \leq 0.05$). ANOVA and *post hoc* Tukey's test.

Table S4. Effects of surfactant and initiator concentrations on conversion and particle diameter for styrene polymerizations with C1EG surfactant.

[S] ×CMC	**Conversion [%]**	**PD [nm]**	**Initiator [mol×10^4]**	**Conversion [%]**	**PD [nm]**
10.9	96.9 ± 0.6 **a**	66.2 ± 1.1 **ab**	**3.85**	96.9 ± 0.6 **a**	66.2 ± 1.1 **ab**
7.7	85.9 ± 1.8 **b**	64.3 ± 1.2 **b**	**5.53**	85.9 ± 1.8 **b**	64.3 ± 1.2 **b**
7.7	88.2 ± 0.7 **b**	69.6 ± 0.2 **a**	**3.68**	88.2 ± 0.7 **b**	69.6 ± 0.2 **a**

* Different letters indicate significant differences ($p \leq 0.05$). ANOVA and *post hoc* Tukey's test.

Table S5. Effects of surfactant and initiator concentrations on conversion and particle diameter for styrene polymerizations with DTAB surfactant.

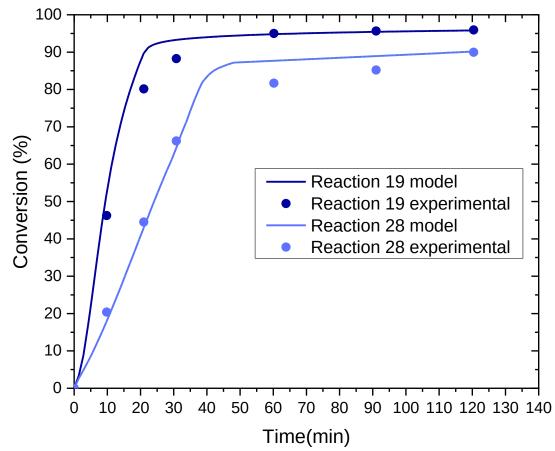
[S] ×CMC	**Conversion [%]**	**PD [nm]**	**Initiator [mol×10^4]**	**Conversion [%]**	**PD [nm]**
3.5	96.4 ± 0.7 **a**	59.2 ± 0.5 **a**	**3.93**	96.4 ± 0.7 **a**	59.2 ± 0.5 **a**
3	89.4 ± 3.5 **a**	53.7 ± 0.9 **b**	**3.14**	89.4 ± 3.5 **a**	53.7 ± 0.9 **b**
2	90.3 ± 0.4 **a**	61.2 ± 0.1 **a**			

* Different letters indicate significant differences ($p \leq 0.05$). ANOVA and *post hoc* Tukey's test.

Table S6. Effects of surfactant and initiator concentrations on conversion and particle diameter for MMA polymerizations with C1EG surfactant.

[S] ×CMC	**Conversion [%]**	**PD [nm]**	**Initiator [mol×10^4]**	**Conversion [%]**	**PD [nm]**
7.7	94.9 ± 2.4 **a**	72.5 ± 7.9 **a**	**3.68**	94.9 ± 2.4 **a**	72.5 ± 7.9 **a**
10.1	97.6 ± 0.3 **a**	71.5 ± 0.9 **a**	**3.80**	97.6 ± 0.3 **a**	71.5 ± 0.9 **a**
7.7	95.2 ± 0.0 **a**	60.9 ± 0.4 **b**	**5.57**	95.2 ± 0.0 **a**	60.9 ± 0.4 **b**

* Different letters indicate significant differences ($p \leq 0.05$). ANOVA and *post hoc* Tukey's test.



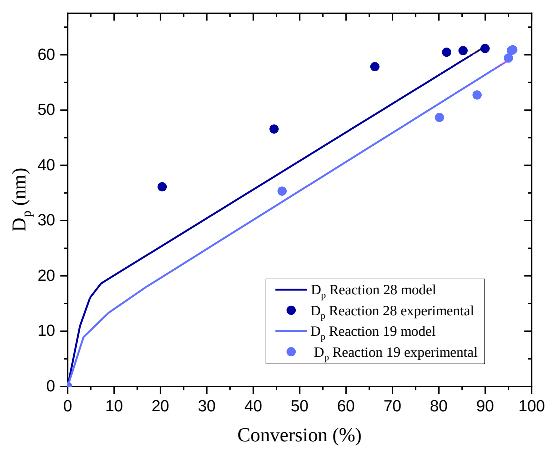
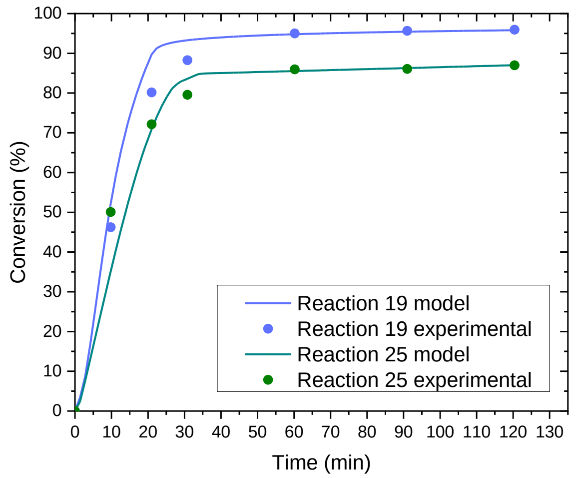


Figure S1. Comparison of simulation (POLYRED) and experimental data for conversion vs. time of reaction (left) and D_p vs. conversion (right) for experiments E19 and E28.



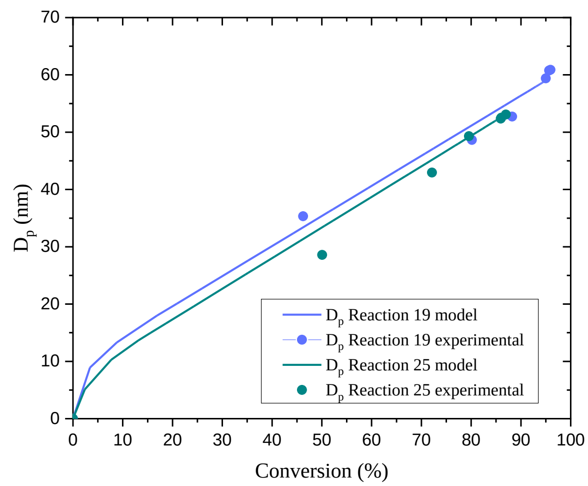


Figure S2. Comparison of simulation (POLYRED) and experimental data for conversion vs. time of reaction (upper) and D_p vs. conversion (lower) for experiments E19 and E25.

Table S7. Main physical and kinetic parameters used in the POLYRED simulations (70 °C)

Parameter [reference]	Description	Value
C1EG r_h (nm) [63]	Micellar radium	1.90
DTAB r_h (nm) [64]	Idem	1.30
K_d (s^{-1}) V-50	Initiator kinetic constant	2.038 x 10^{+11}
$k_{p, St}$ (L mol^{-1} s^{-1}) [65]	St propagation kinetic constant	126
$k_{p, MMA}$ (L mol^{-1} s^{-1}) [65]	St propagation kinetic constant	646
$K_{t, MMA}$ (L mol^{-1} s^{-1}) [66]	MMA termination kinetic constant	1.05 x 10^{+9}
$K_{t, St}$ (L mol^{-1} s^{-1}) [67]	St termination kinetic constant	1.75 x 10^{+9}
$D_{P, St}$ (g L^{-1}) [67]	PSt density	1054
$D_{P, MMA}$ (g L^{-1}) [67]	PMMA density	1170
T, K	Temperature of reaction	343.15
X_{St} [67]		4.8
X_{MMA} [67]		2.4

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