

Supporting information

to

Structure of Polyglycerol Oleic Acid Ester Nonionic Surfactant Reverse Micelles in Decane: Growth Control by Headgroup Size

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Table S1: Densities of surfactants and oils at 25 °C

Solvents or Surfactants	Density-25 °C / gm cm ⁻³
Decane	0.726509
C ₁₈₋₁ G ₁	0.958984
C ₁₈₋₁ G ₂	1.018061
C ₁₈₋₁ G ₄	1.032308
C ₁₈₋₁ G ₆	1.094759

Table S2: Electron density difference of the hydrophilic part in different systems at different temperatures

Systems	Electron density difference of the hydrophilic part ($\Delta\rho$) / el/nm ³
5 wt% C ₁₈₋₁ G ₁ /decane-25 °C	96.59
5 wt% C ₁₈₋₁ G ₂ /decane-25 °C	135.58
5 wt% C ₁₈₋₁ G ₂ /decane-50 °C	126.12
10 wt% C ₁₈₋₁ G ₂ /decane-25 °C	132.96
5 wt% C ₁₈₋₁ G ₄ /decane-25 °C	118.07
5 wt% C ₁₈₋₁ G ₆ /decane-25 °C	142.78
10 wt% C ₁₈₋₁ G ₂ /decane + 0% water-25 °C	132.96
10 wt% C ₁₈₋₁ G ₂ /decane + 0.4% water-25 °C	148.71
10 wt% C ₁₈₋₁ G ₂ /decane + 0.8% water-25 °C	166.91
10 wt% C ₁₈₋₁ G ₂ /decane + 1.0% water-25 °C	179.92
10 wt% C ₁₈₋₁ G ₂ /decane + 1.2% water-25 °C	197.58

Table S3: Effect of headgroup size of the surfactant on the structure parameters, short axis (*a*), long axis (*b*) of prolate, and aggregation number (*N*_{agg}), obtained from the results of model fittings:

System	Short axis (<i>a</i>) / nm	Long axis (<i>b</i>) / nm	<i>N</i> _{agg}
5 wt% C ₁₈₋₁ G ₁ /decane-25 °C	1.43	3.00	17
5 wt% C ₁₈₋₁ G ₂ /decane-25 °C	1.94	4.92	49
5 wt% C ₁₈₋₁ G ₄ /decane-25 °C	2.64	7.69	132
5 wt% C ₁₈₋₁ G ₆ /decane-25 °C	3.90	9.72	410

Table S4: Effect of headgroup size of the surfactant on the structure factor parameters, effective volume fraction (ϕ), effective interaction radius (*R*), and the polydispersity (μ) obtained from the GIFT method:

System	Effective volume fraction (ϕ)	Interaction radius (<i>R</i>)	Polydispersity (μ)
5 wt% C ₁₈₋₁ G ₁ /decane-25 °C	0.05	2.00	0.06
5 wt% C ₁₈₋₁ G ₂ /decane-25 °C	0.05	3.20	0.06
5 wt% C ₁₈₋₁ G ₄ /decane-25 °C	0.045	4.00	0.03
5 wt% C ₁₈₋₁ G ₆ /decane-25 °C	0.045	5.00	0.06

Table S5: Effect of temperature on the structure parameters of reverse micelles obtained from the results of model fittings:

System	Short axis (<i>a</i>) / nm	Long axis (<i>b</i>) / nm	<i>N</i> _{agg}
5 wt% C ₁₈₋₁ G ₂ /decane -25 °C	1.94	4.92	49

5 wt% C ₁₈₋₁ G ₂ /decane -50 °C	1.94	4.76	43
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Table S6: Effect of temperature on the structure factor parameters obtained from GIFT method:

System	Effective volume fraction (ϕ)	Interaction radius (R)	Polydispersity (μ)
5 wt% C ₁₈₋₁ G ₂ /decane -25 °C	0.05	3.20	0.06
5 wt% C ₁₈₋₁ G ₂ /decane -50 °C	0.05	3.00	0.06
5 wt% C ₁₈₋₁ G ₂ /decane -75 °C	0.047	2.83	0.03

Table S7: Effect of concentration on the structure parameters obtained from the results of model fittings:

System	Short axis (a) / nm	Long axis (b) / nm	N_{agg}
5 wt% C ₁₈₋₁ G ₂ -25 °C	1.94	4.92	49
10 wt% C ₁₈₋₁ G ₂ -25 °C	1.94	4.91	49

Table S8: Effect of concentration on the structure factor parameters obtained from GIFT method:

System	Effective volume fraction (ϕ)	Interaction radius (R)	Polydispersity (μ)
5 wt% C ₁₈₋₁ G ₂	0.05	3.20	0.06
10 wt% C ₁₈₋₁ G ₂	0.08	3.45	0.034
15 wt% C ₁₈₋₁ G ₂	0.13	3.20	0.02
20 wt% C ₁₈₋₁ G ₂	0.18	3.20	0.02
25 wt% C ₁₈₋₁ G ₂	0.24	3.19	0.04

Table S9: Effect of added water on the structure parameters obtained from the results of model fittings:

System	Short axis (a) / nm	Long axis (b) / nm	N_{agg}
0% water	1.94	4.91	49
0.4% water	2.15	5.24	82
0.8% water	2.48	6.12	135
1.0% water	2.51	7.00	168
1.2% water	2.61	8.66	224

Table S10: Effect of added water on the structure factor parameters obtained from GIFT method:

System	Effective volume fraction (ϕ)	Interaction radius (R)	Polydispersity (μ)
0% water	0.08	3.45	0.034
0.4% water	0.085	3.50	0.025
0.8% water	0.095	4.00	0.03
1.0% water	0.10	4.22	0.06
1.2% water	0.123	4.27	0.04