

Supporting information

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

Solvents or Surfactants	Density-25 °C / gm cm ⁻³
Cyclohexane	0.773812
Decane	0.726469
Hexadecane	0.770041
(iso-C ₁₈) ₂ G ₂	0.949577
(iso-C ₁₈) ₃ G ₂	0.930447
(iso-C ₁₈) ₄ G ₂	0.921208

Table S2: Electron density difference of the hydrophilic part in different systems at 25 °C.

Systems	Electron density difference of the hydrophilic part/ el/nm ³
5 wt% (iso-C ₁₈) ₂ G ₂ /cyclohexane	193.47
5 wt% (iso-C ₁₈) ₂ G ₂ /decane	231.16
5 wt% (iso-C ₁₈) ₂ G ₂ /hexadecane	200.74
5 wt% (iso-C ₁₈) ₃ G ₂ /decane	267.43
5 wt% (iso-C ₁₈) ₄ G ₂ /decane	307.25

Table S3: Effect of oil nature on the structure factor parameters, effective volume fraction (ϕ), effective interaction radius (R), and the polydispersity obtained from the GIFT evaluation of the SAXS data at 25 °C.

Systems	Effective volume fraction (ϕ)	Interaction radius (R)	Polydispersity
5 wt% (iso-C ₁₈) ₂ G ₂ /cyclohexane	0.0314	1.44	0.02
5 wt% (iso-C ₁₈) ₂ G ₂ /decane	0.0385	1.91	0.05
5 wt% (iso-C ₁₈) ₂ G ₂ /hexadecane	0.0546	1.95	0.03

Table S4: Structure parameters obtained from model fitting in 5 wt% (iso-C₁₈)₂G₂/oil systems at 25 °C.

Systems	Short axis (a) / nm	Long axis (b) / nm	N_{agg}
5 wt% (iso-C ₁₈) ₂ G ₂ /cyclohexane	0.86	2.12	26
5 wt% (iso-C ₁₈) ₂ G ₂ /decane	0.97	3.16	52
5 wt% (iso-C ₁₈) ₂ G ₂ /hexadecane	0.98	3.46	56

Table S5: Effect of lipophilic tail architecture of the surfactant on the structure factor parameters for the 5 wt% (iso-C₁₈)₂G₂/decane systems at 25 °C.

Systems	Effective volume fraction (ϕ)	Interaction radius (R)	Polydispersity
5 wt% (iso-C ₁₈) ₂ G ₂ /decane	0.0385	1.91	0.05
5 wt% (iso-C ₁₈) ₃ G ₂ /decane	0.0407	1.17	0.02
5 wt% (iso-C ₁₈) ₄ G ₂ /decane	0.0302	1.50	0.05

Table S6: Effect of lipophilic tail architecture of the surfactant on the structure parameters reverse micellar aggregates at 25 °C obtained from model fit.

Systems	Short axis (a) / nm	Long axis (b) / nm	N_{agg}
5 wt% (iso-C ₁₈) ₂ G ₂ /decane	0.97	3.16	52
5 wt% (iso-C ₁₈) ₃ G ₂ /decane	0.77	2.44	24
5 wt% (iso-C ₁₈) ₄ G ₂ /decane	0.63	1.73	11

Table S7: Effect of surfactant concentration on the structure factor parameters for the (iso-C₁₈)₂G₂/decane systems at 25 °C.

Systems	Effective volume fraction (ϕ)	Interaction radius (R)	Polydispersity
5 wt% (iso-C ₁₈) ₂ G ₂ /decane	0.0385	1.91	0.05
10 wt% (iso-C ₁₈) ₂ G ₂ /decane	0.0700	2.01	0.05
15 wt% (iso-C ₁₈) ₂ G ₂ /decane	0.1421	1.98	0.04
20 wt% (iso-C ₁₈) ₂ G ₂ /decane	0.1633	1.88	0.05
25 wt% (iso-C ₁₈) ₂ G ₂ /decane	0.2412	1.85	0.04

Table S8: Effect of temperature on the structure factor parameters for the 10 wt% (iso-C₁₈)₂G₂/decane systems.

Systems	Effective volume fraction (ϕ)	Interaction radius (R)	Polydispersity
25 °C	0.0700	2.01	0.05
50 °C	0.0710	1.84	0.03
75 °C	0.0569	1.63	0.03

Table S9: Effect of concentration of added water on the structure factor parameters for the 10 wt% (iso-C₁₈)₂G₂/decane systems at 25 °C.

Systems	Effective volume fraction (ϕ)	Interaction radius (R)	Polydispersity
0% water	0.095	1.8	0.04
0.10% water	0.098	2.1	0.04
0.20% water	0.099	2.2	0.05
0.30% water	0.097	2.2	0.06

Table S10: Effect of concentration of added water on the structure parameters of micellar aggregates obtained from model fitting at 25 °C.

Systems	Short axis (a) / nm	Long axis (b) / nm	N_{agg}
0% water	0.97	3.16	52
0.10% water	1.16	3.46	83
0.20% water	1.24	4.00	113
0.30% water	1.28	4.12	124