ESI

Oil-in-oil emulsions stabilised solely by solid particles

B.P. Binks* and A.T. Tyowua

Department of Chemistry, University of Hull, Hull. HU6 7RX. UK

Table S1. Details of particles other than fumed silica used in this work.

Particle	Coating reagent	Commercial name	Source	Shape	Size/μm
Silicone	Perfluoroalkyl phosphate	PF-5 Tospearl 145A	Kobo Products, Japan	Sphere	4–5
Sericite	Perfluoroalkyl phosphate	PF-5 Eight Pearl 300S-Al	Daito Kasei, Japan	Platelet	1–10
		PF-10 Eight Pearl 300S-Al	Daito Kasei, Japan	Platelet	1–10
		PF-10 FSE-Al	Daito Kasei, Japan	Platelet	1–10
ZnO	Perfluoroalkyl phosphate	PFX-10 ZnO (TP)	Daito Kasei, Japan	Sphere	1–8
Bentonite	–	PFX-10 Kunipia F	Daito Kasei, Japan	Platelet	100–400
	Quaternary stearyl	Bentone 34	Rheox Ltd., UK	Platelet	2–30
$CaCO_3$	–	Whiscal A	Maruo Calcium Co. Japan	Rod	l ~25; d~ 1
	Stearate	Calofort SV	Specialty Minerals, UK	Sphere	0.1-0.2
PTFE	$(CF_2{-}CF_2)_n$	Zonyl MP1400	E and E Ltd., UK	Various	1–10

Figure S1. Fraction of 20 cS PDMS $f_{20\ cS\ \mathrm{PDMS}}$ (●) and fraction of sunflower oil f_{suno} (×) released from 20 cS PDMS-in-sunflower oil emulsions (1:1, 1 month after preparation) stabilised by 1 wt.% of DCDMS-coated fumed silica particles *versus* % SiOH on particle surfaces. $f_{20\ cS\ \mathrm{PDMS}}$ represents the stability of the emulsions to coalescence whilst f_{suno} represents the stability of the emulsions to sedimentation. The corresponding data for 20 cS PDMS-in-olive oil emulsions is not plotted because the values are the same apart from 23% SiOH where $f_{20\ cS\ \mathrm{PDMS}} \sim 0.2$.

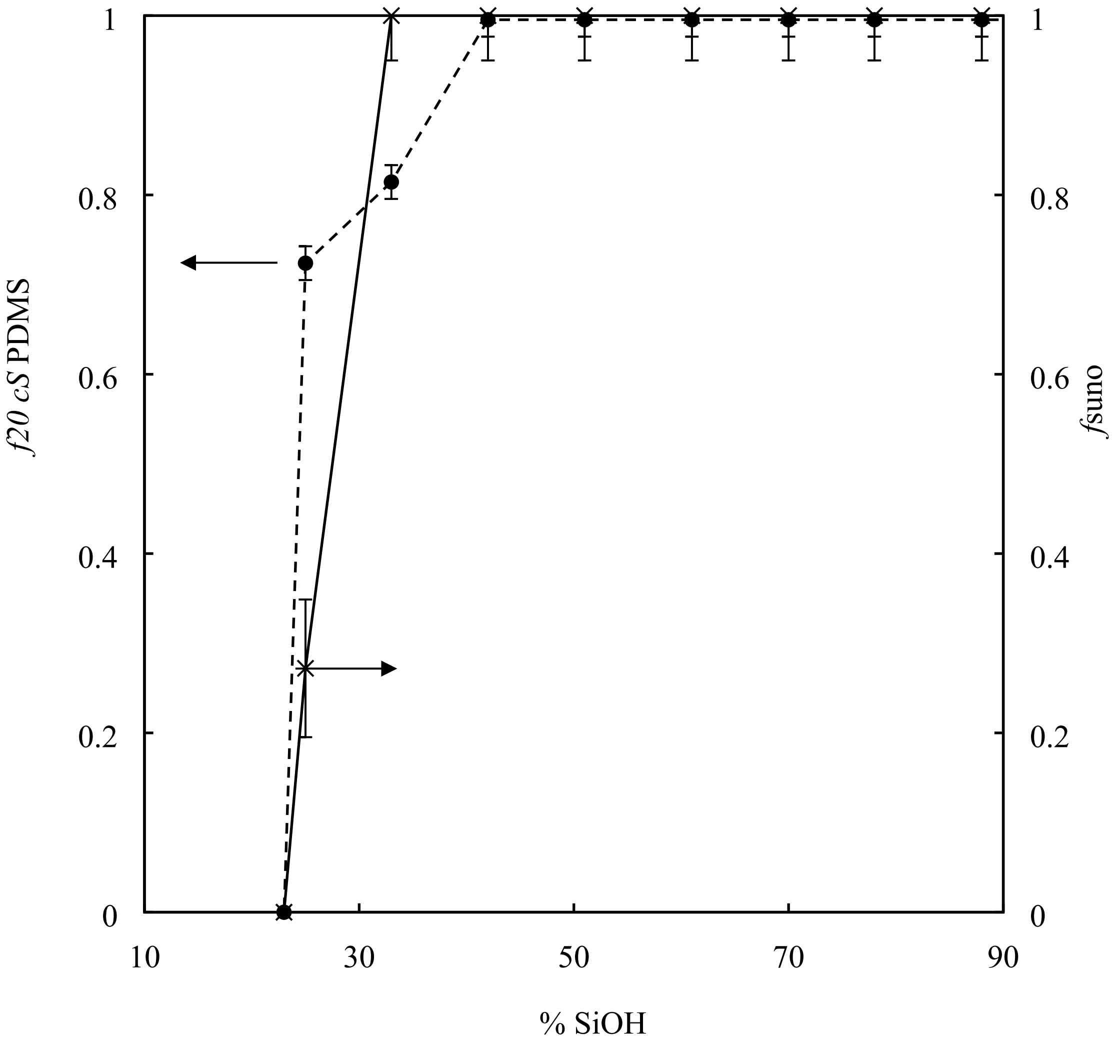


Figure S2. (a) Fraction of sunflower oil f_{suno} released from 50 cS PDMS-in-sunflower oil (●) and 100 cS PDMS-in-sunflower oil (○) emulsions (1:1, 1 month after preparation) and (b) fraction of olive oil f_{oo} released from 50 cS PDMS-in-olive oil (❋) and 100 cS PDMS-in-olive oil (◷) emulsions (1:1, 1 month after preparation) *versus* % SiOH on DCDMS-coated fumed silica particle surfaces. f_{suno} and f_{oo} serve as a measure of the stability of the emulsions to sedimentation.

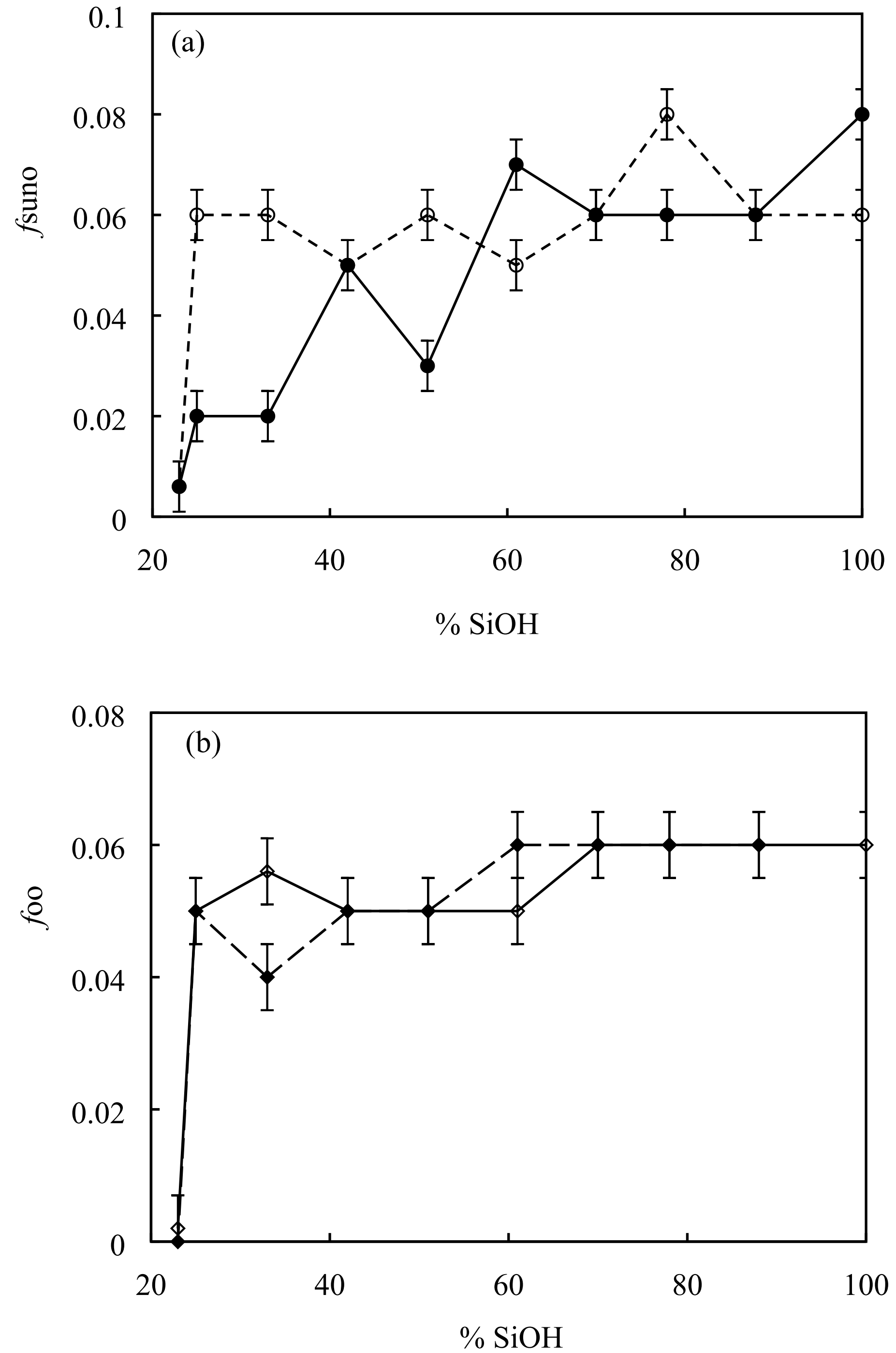


Figure S3. Photographs of inverted glass vials containing (a) PDMS (i) 20, (ii) 50 and (iii) 100 cS plus 2 wt.% (left) and 5 wt.% (right) of 100% SiOH fumed silica, (b) (i) sunflower, (ii) olive and (iii) rapeseed oil plus 2 wt.% (left) and 5 wt.% (right) of 100% SiOH fumed silica and (c) PDMS (i) 20, (ii) 50 and (iii) 100 cS plus 2 wt.% (left) and 5 wt.% (right) of 14% SiOH fumed silica particle dispersions all 1 week after formation.

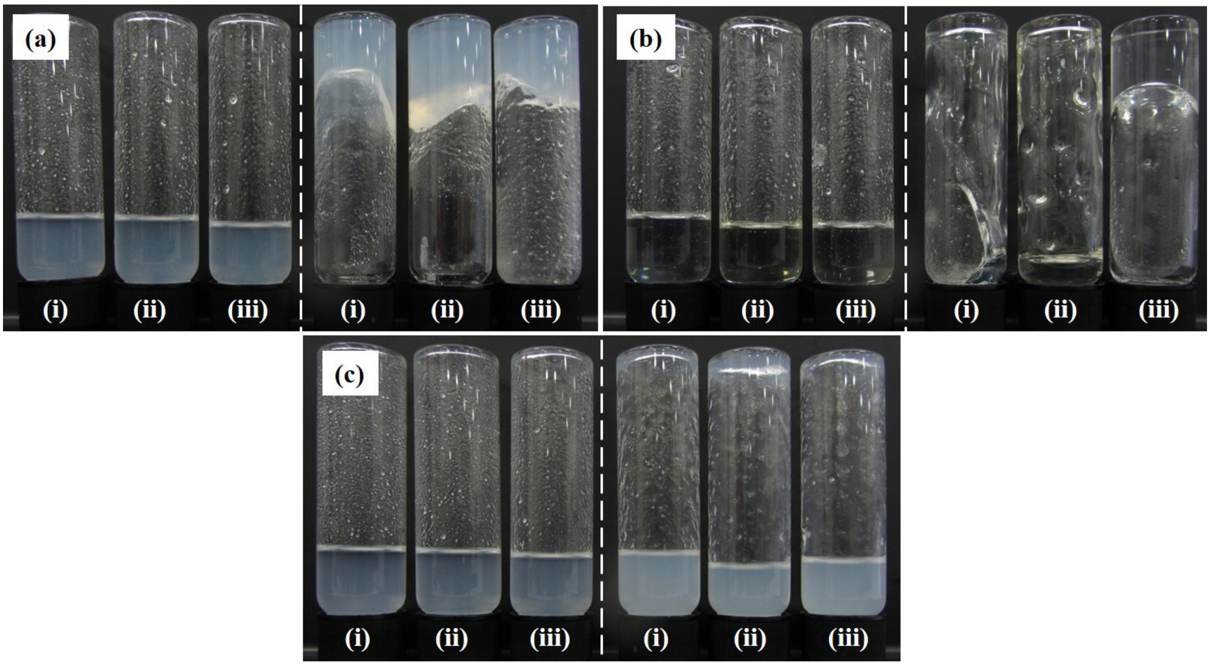


Figure S4. (upper) Photographs of glass vials containing emulsions of sunflower oil-PDMS (a) 20, (b) 50 and (c) 100 cS (left), olive oil-PDMS (a) 20, (b) 50 and (c) 100 cS (middle) and rapeseed oil-PDMS (a) 20, (b) 50 and (c) 100 cS (right) 1 month after preparation stabilised by 1 wt.% of 75% SiOH fluorinated fumed silica particles. Particles were initially in (i) PDMS oil or (ii) vegetable oil. Emulsions are (a) 20 cS PDMS continuous and vegetable oil continuous for (b) and (c), irrespective of the initial location of the particles. (lower) Corresponding optical micrographs of the emulsions in (ii). Scale bar = 100 μm.

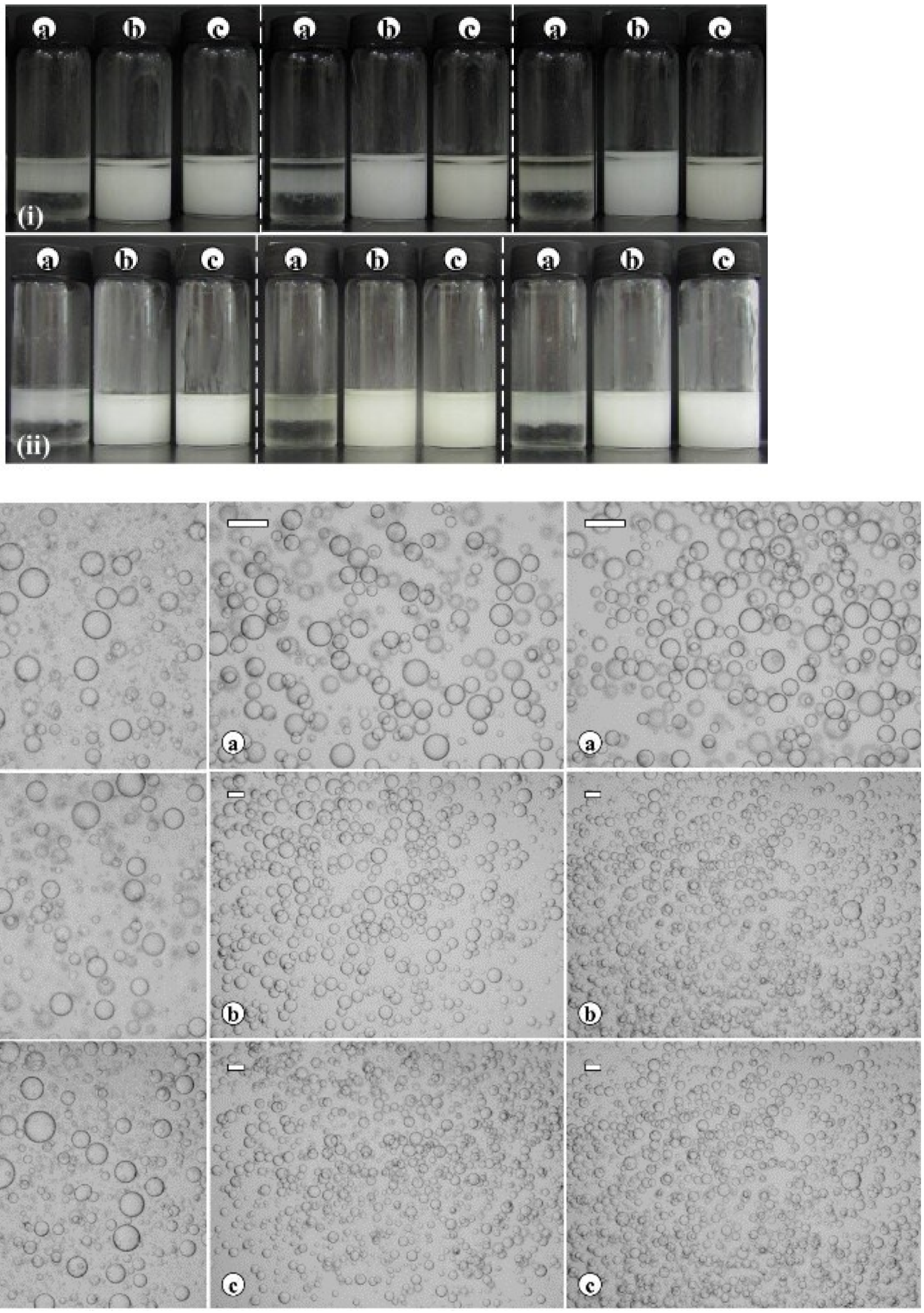


Figure S5. (upper) Photographs of glass vials containing 100 cS PDMS-in-(a) sunflower oil, (b) olive oil and (c) rapeseed oil emulsions (1:1, 1 month after preparation) stabilised by different concentrations (given, wt.%) of 75% SiOH fluorinated fumed silica particles. (lower) Corresponding optical micrographs of the emulsions at selected particle concentrations (given, wt.%). Scale bar = 100 μm.

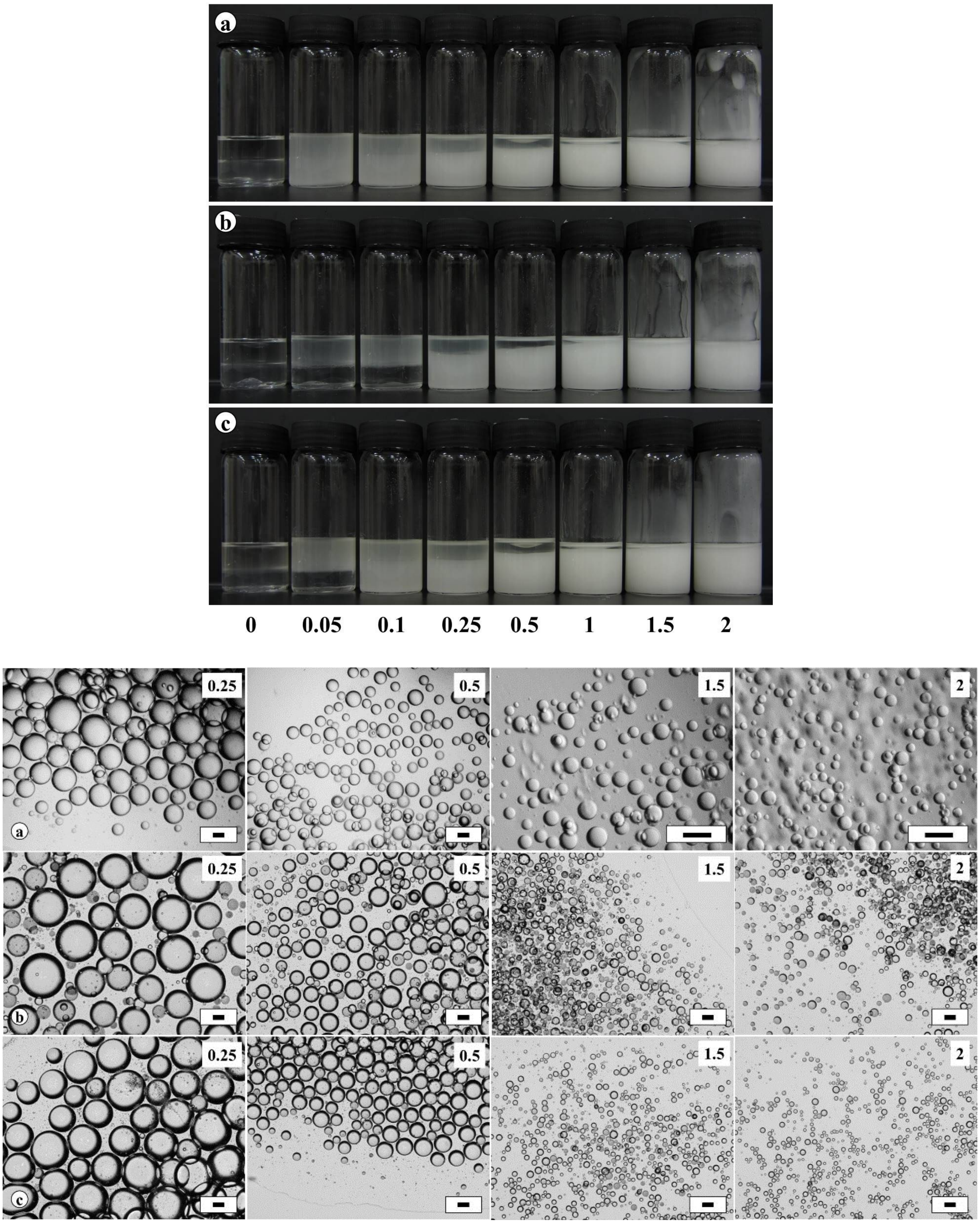
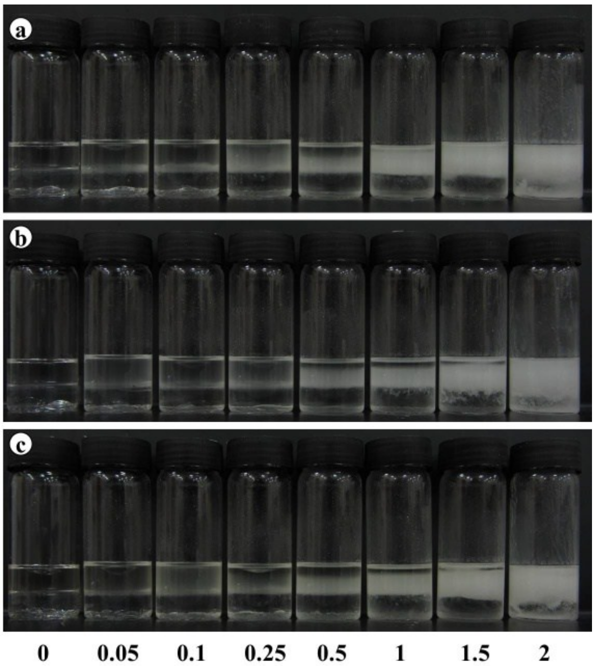


Figure S6. (upper) Photographs of glass vials containing (a) sunflower oil-, (b) olive oil-, (c) rapeseed oil-in-20 cS PDMS emulsions (1:1, 1 month after preparation) stabilised by different concentrations (given, wt.%) of 75% SiOH fluorinated fumed silica particles. (lower) Corresponding optical micrographs of the emulsions at selected particle concentrations (given, wt.%). Scale bar = 100 μm.



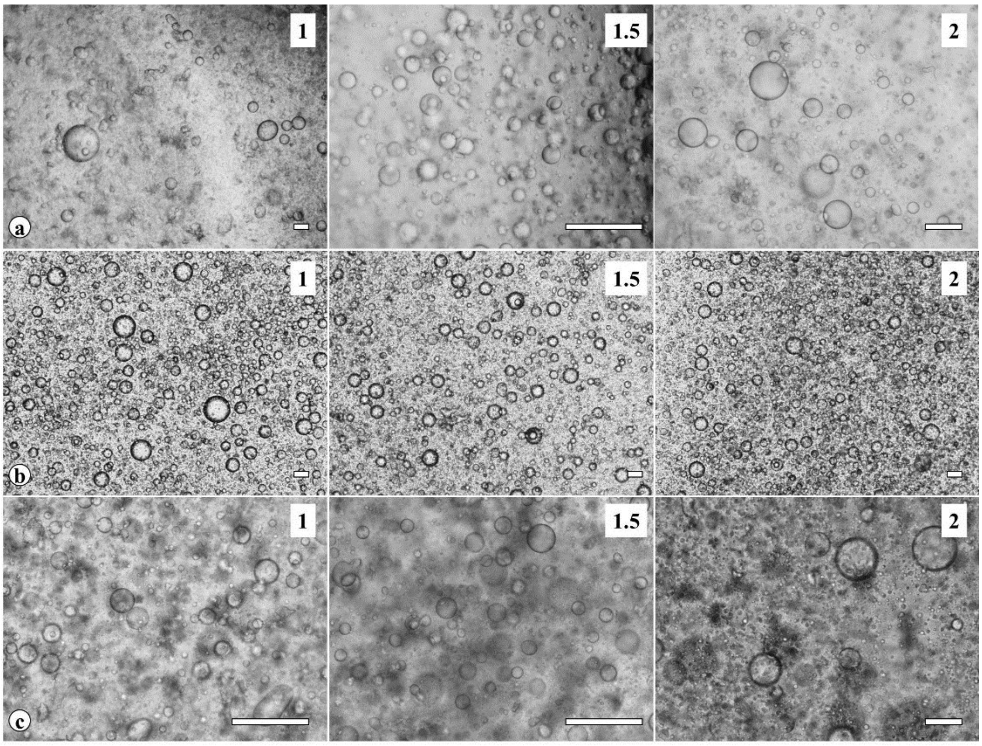


Figure S7. (upper) Photographs of glass vials containing olive oil-in-PDMS (a) 20 cS and (b) 50 cS emulsions (1:1, 1 month after preparation) stabilised by different concentrations (given, wt.%) of PF-5 Eight Pearl 300S-Al sericite particles. (lower) Corresponding optical micrographs of the emulsions stabilised by the given concentrations (wt.%) of particles. The average droplet diameter of the emulsions is also given.

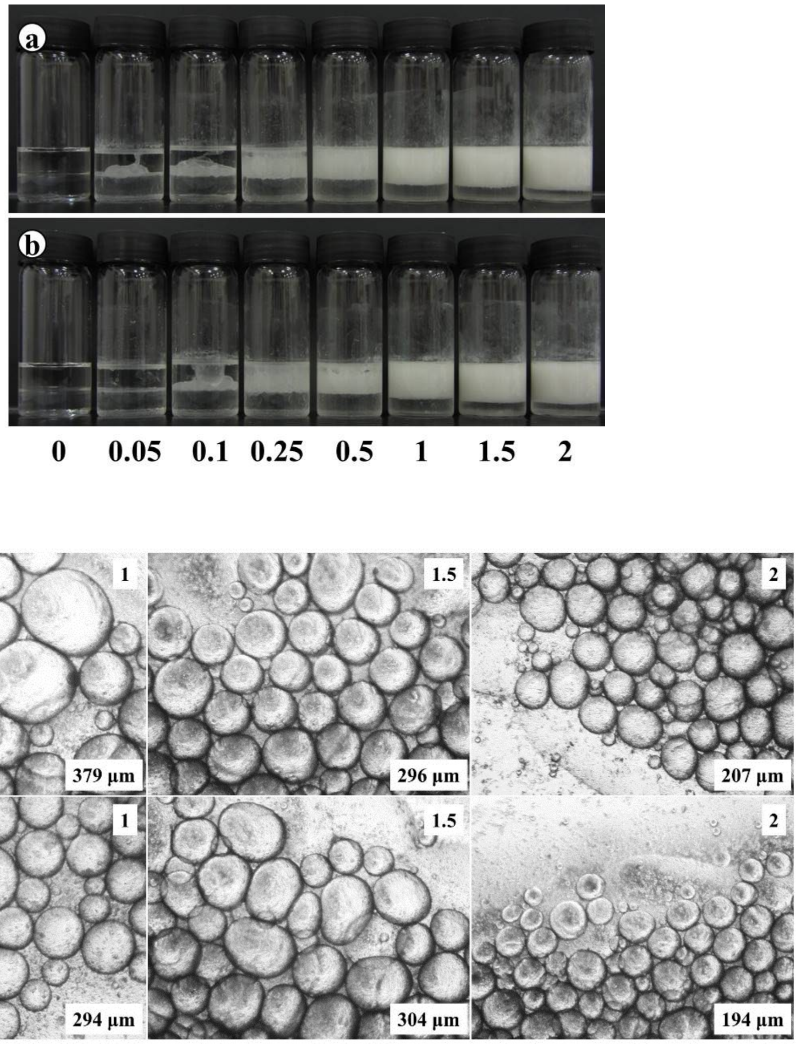


Figure S8. Fraction of olive oil f_{oo} (●) and fraction of PDMS oil $f_{\mathrm{PDMS\ oil}}$ (○) released from olive oil-in-PDMS (a) 20 cS and (b) 50 cS emulsions (1:1, 1 month after preparation) shown in Figure S7 *versus* particle concentration. $f_{20\ cS\ \mathrm{PDMS}}$ ($f_{50\ cS\ \mathrm{PDMS}}$) and f_{oo} represent the stability of the emulsions to creaming and coalescence respectively.

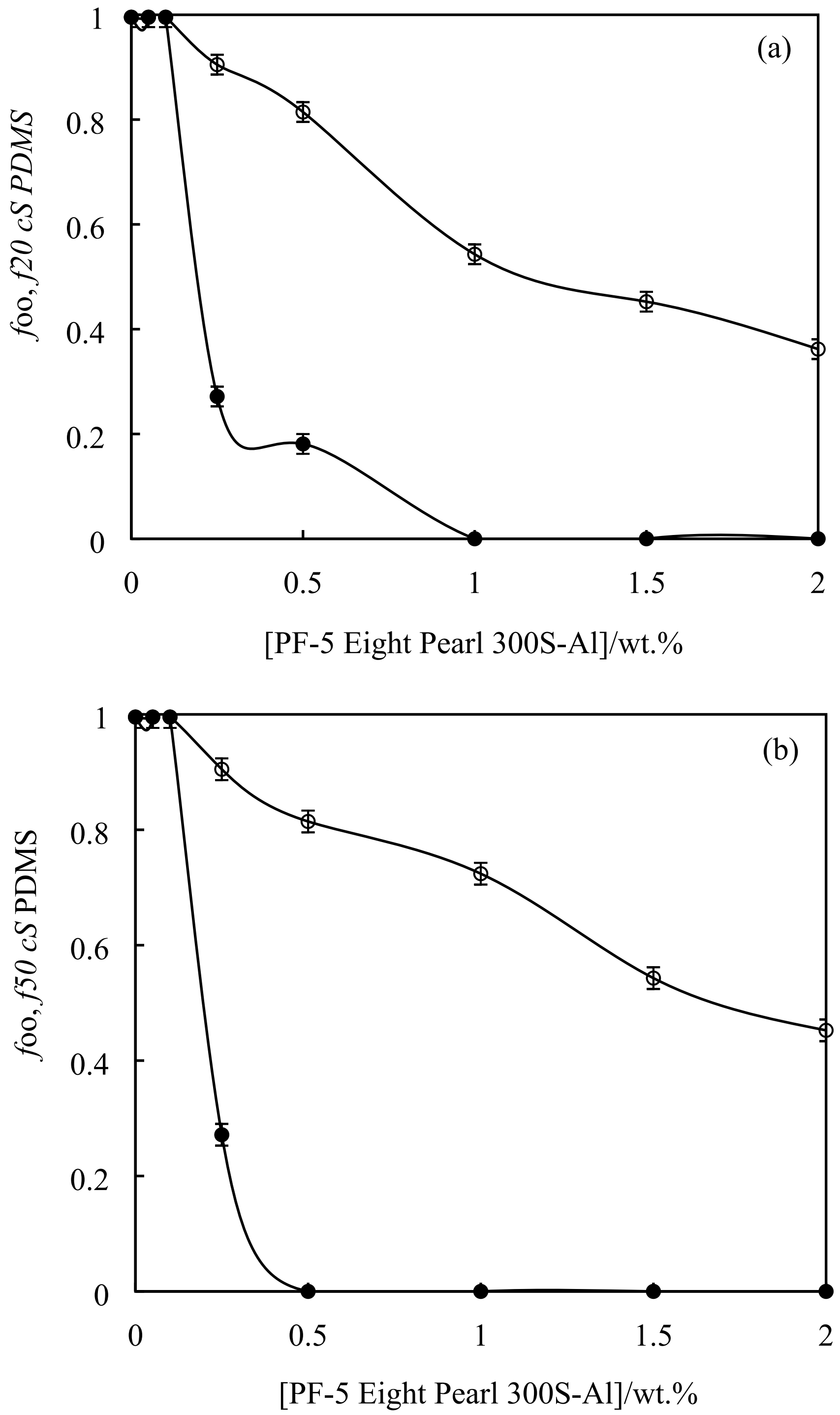
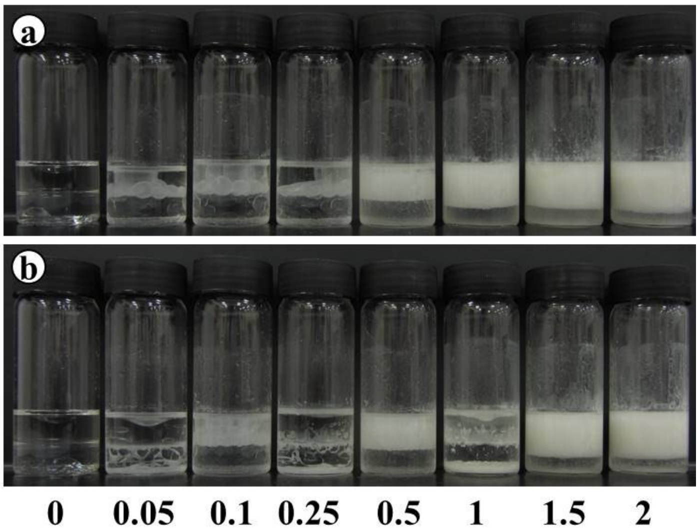


Figure S9. (upper) Photographs of glass vials containing rapeseed oil-in-PDMS (a) 20 cS and (b) 50 cS emulsions (1:1, 1 month after preparation) stabilised by different concentrations (given, wt.%) of PF-5 Eight Pearl 300S-Al sericite particles. (lower) Corresponding optical micrographs of the emulsions stabilised by the given particle concentrations (wt.%). Also given is the average droplet diameter of the emulsions.



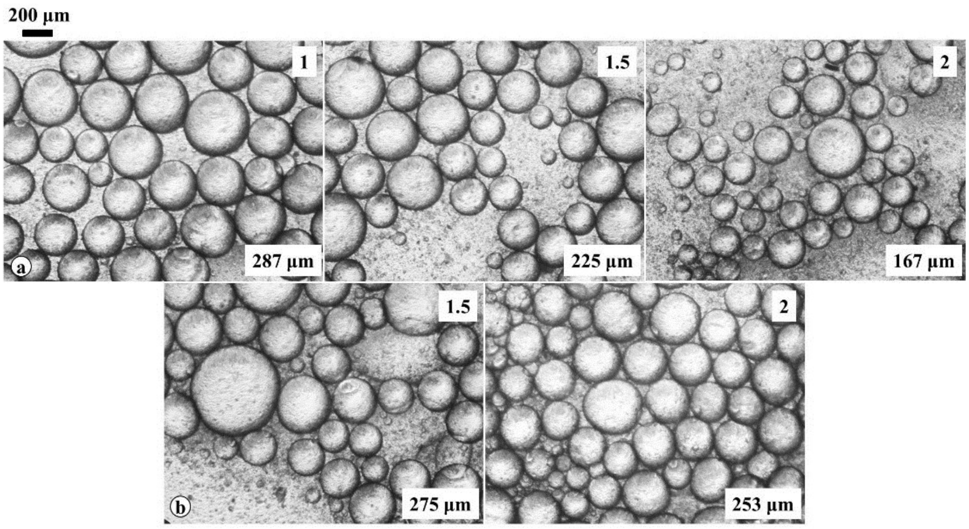


Figure S10. Fraction of rapeseed oil f_{ro} (●) and fraction of PDMS oil $f_{PDMS\ oil}$ (○) released from rapeseed oil-in-PDMS (a) 20 cS and (b) 50 cS emulsions (1:1, 1 month after preparation) shown in Figure S9 *versus* particle concentration. The $f_{20\ cS\ \mathrm{PDMS}}$ ($f_{50\ cS\ \mathrm{PDMS}}$) and f_{ro} represent the stability of the emulsions to creaming and coalescence respectively.

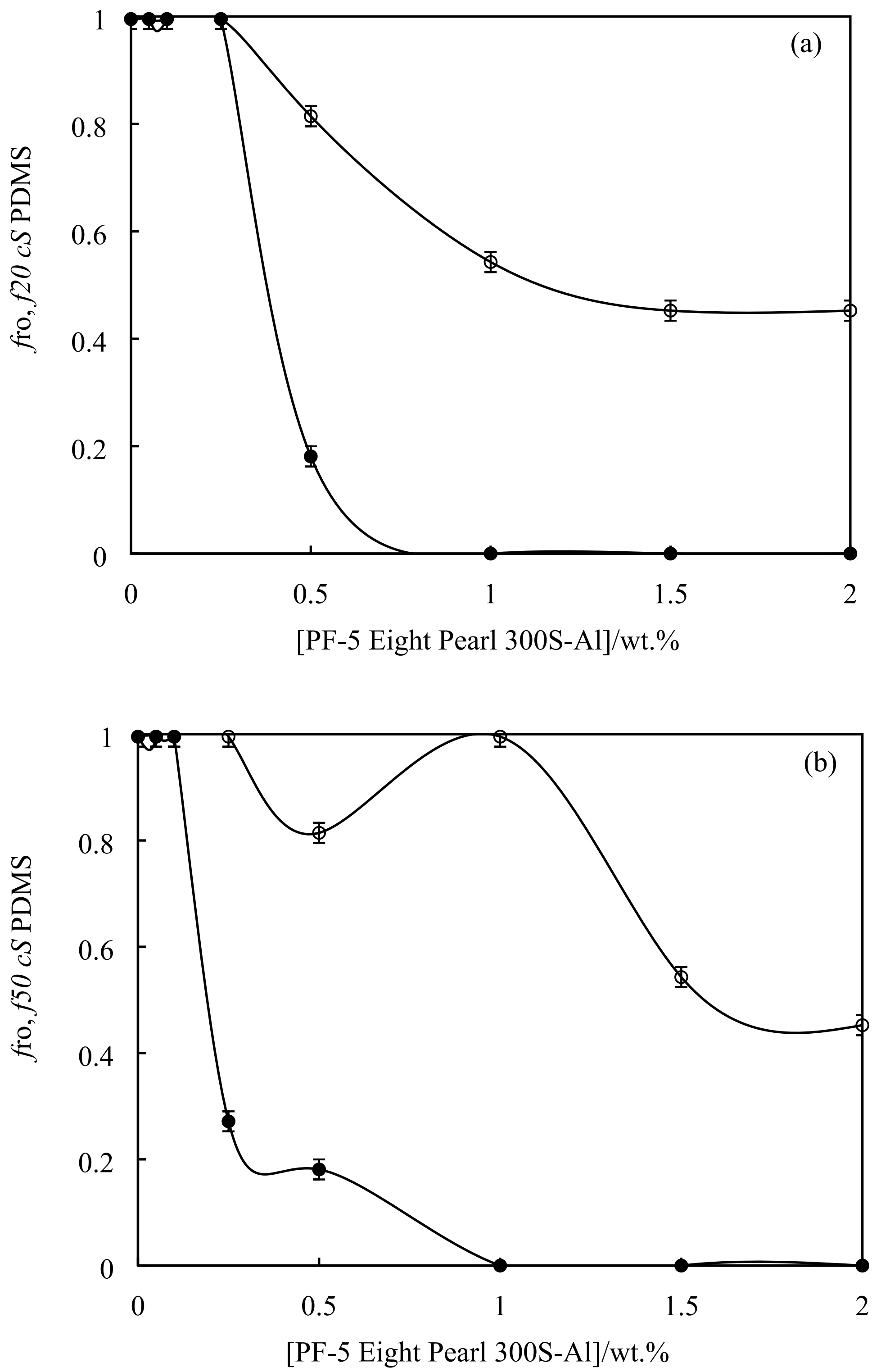


Figure S11. (upper) Photograph after 1 month of glass vials containing (a) 20 cS PDMS-in-sunflower oil emulsions 1:1 stabilised by 1 wt.% of (i) Whiscal A and (ii) PFX-10 Kunipia F particles and (b) sunflower oil-in-20 cS PDMS emulsions stabilised by 1 wt.% of (i) PFX-10 ZnO (TP), (ii) PF-10 Eight Pearl 300S-Al[a], (iii) PF-10 FSE-Al, (iv) Bentone 34, (v) Zonyl MP 1400, (vi) Calofort SV and (vii) PF-5 Tospearl 145A particles. (lower) Corresponding optical micrographs of the sunflower oil-in-20 cS PDMS emulsions stabilised by (a) PF-10 Eight Pearl 300S-Al[a], (b) PF-10 FSE-Al and (c) Calofort SV particles. The average droplet diameter is also given.