

SUPPORTING INFORMATION

Full and Partial Emulsification of Crude Oil-Water Systems as a Function of Shear Intensity, Water Fraction and Temperature

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1. The critical water fraction for full emulsification

For the eight studied crude oils, the critical water fractions of the systems for full emulsification are shown in Table S1.

Table S1. Critical water fractions of the systems for full emulsification.

oil specimen	critical water fraction	standard deviation
A	0.65	0.012
B	0.70	0.010
C	0.60	0
D	0.62	0.010
E	0.55	0.012
F	0.65	0.010
G	0.57	0.012
H	0.60	0.010

2. The range of shear rate for full emulsification

For the eight studied crude oils, the ranges of shear rate for full emulsification at 40 °C are shown in Table S2.

Table S2. The range of shear rate for full emulsification (40 °C)

water fraction	range of shear rate (s ⁻¹)			
	Oil A	Oil B	Oil C	Oil D
0.30	63.0–(316.6)*	N/A	N/A	N/A
0.35	64.0–224.7	N/A	N/A	66.3–(357.9)
0.40	64.0–151.2	68.0–(339.8)	88.5–(386.7)	69.4–291.9
0.45	N/A	70.7–236.0	91.8–329.6	N/A
0.50	65.1–133.4	74.7–162.2	93.8–126.3	77.5–172.1
0.60	78.8–114.3	86.8–127.2	100.7–119.7	92.6–154.1
0.62	N/A	N/A	N/A	95.5–108.1
0.65	83.7–95.7	N/A	N/A	N/A
0.70	N/A	92.7–103.2	N/A	N/A

*The data in bracket is the highest attainable shear rate of that experiment.

Table S2. The range of shear rate for full emulsification (40 °C) (continued)

water fraction	range of shear rate (s ⁻¹)			
	Oil E	Oil F	Oil G	Oil H
0.30	N/A	N/A	90.3–(378.9)	N/A
0.35	76.3–(408.2)*	N/A	96.2–318.3	85.6–(427.8)
0.40	79.3–315.4	N/A	103.5–282.7	89.3–371.9
0.45	N/A	76.3–(351.6)	N/A	N/A
0.50	94.2–208.8	82.6–277.1	110.4–163.4	97.7–239.1
0.55	99.4–172.4	N/A	N/A	N/A
0.57	N/A	N/A	114.3–123.4	N/A
0.60	N/A	97.8–184.9	N/A	102.9–124.6
0.65	N/A	104.2–158.4	N/A	N/A

* The data in bracket is the highest attainable shear rate of that experiment.