

Supporting Material

Example 1:

Different modes of drop breakup in DC electric field:

System 1a:

Drop: 3-N,N Dimethyl Myristyl ammonio propane sulfonate in water (200 ppm)

Continuous Phase: Castor Oil

Field: DC, 2 KV/cm

MOVIE ATTACHED: *200ppm.mpeg*

System 1b:

Drop: 3-N,N Dimethyl Myristyl ammonio propane sulfonate in water (2000 ppm)

Continuous Phase: Castor Oil

Field: DC, 2 KV/cm

MOVIE ATTACHED: *2000ppm.mpeg*

System 1c:

Drop: 3-N,N Dimethyl Myristyl ammonio propane sulfonate in water (20000 ppm)

Continuous Phase: Castor Oil

Field: DC, 2 KV/cm

MOVIE ATTACHED: *20000ppm.mpeg*

Example 2:

Catastrophic drop breakup in AC (50 Hz) electric field:

Drop: 3-N,N Dimethyl Myristyl ammonio propane sulfonate in water (20000 ppm)

Continuous Phase: Castor Oil

Field: AC 50 Hz, 2 KV/cm

MOVIE ATTACHED: *drop bursting in AC field.mpeg*

Example 3:

Catastrophic Drop Breakup in Electric Fields with various Oil-Water-Surfactant systems:

System 3a: Catastrophic drop breakup

Drop: N-Cetyl-N,N,N, Trimethyl Ammonium bromide (10000 ppm) in water

Continuous Phase: Oleic acid

Field: DC, 2 KV/cm



t = 0 seconds

t = 2 second

t = 4 seconds

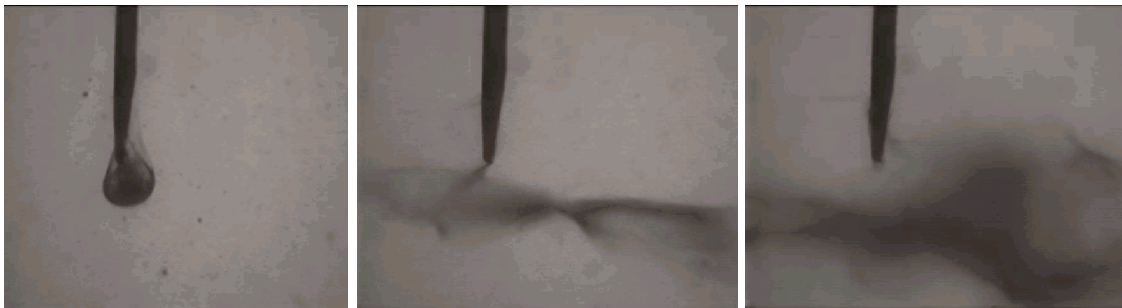
System 3b:

Drop: NH_4OH (2.5 %) in water

Continuous Phase: Ricinoleic acid

Field: DC, 2 KV/cm

Ammonium Ricinoleate is formed at the drop interface by reaction between NH_4OH and Ricinoleic acid.



t = 0 seconds

t = 2 second

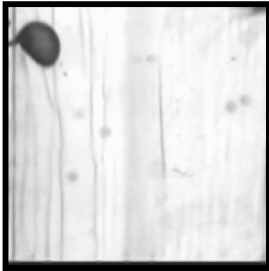
t = 4 seconds

System 3c:

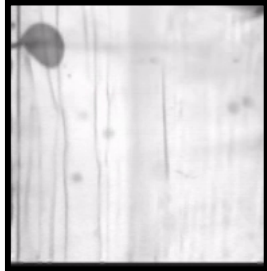
Drop: 3-N,N Dimethyl Myristyl ammonio propane sulfonate in water (20000 ppm)

Continuous Phase: 65% Castor Oil + 35% Perchloroethylene

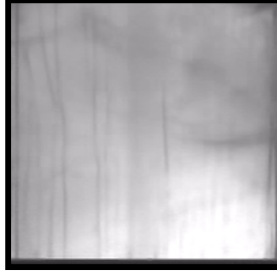
Field: DC, 2.5 KV/cm



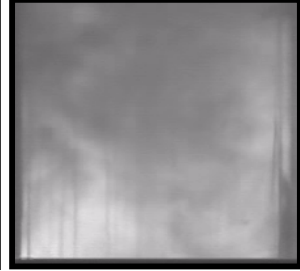
T = 0



T = 33 ms



T = 66 ms



T = 100 ms