Pickfood Geilo Meeting

Francoise Brochard-Wyart

Pipette aspiration of oil in water pickering droplets:

Surface tension of pickering emulsion

close-packed jamming of particles

Arrested Coalescence in Pickering emulsions

Micropipette aspiration:from droplets to gas vesicles

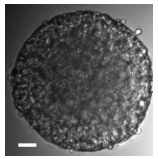
Jaakko Timonem group **Piezoelectric pressure controller : from +1to -1bar, resolution 1Pa**

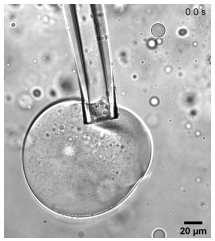
Gregory Beaune

Living Droplets

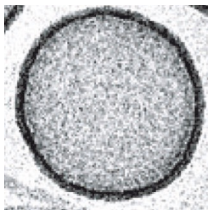
Coercavates

Jelly beads





Karine Guevorkian

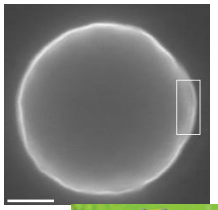


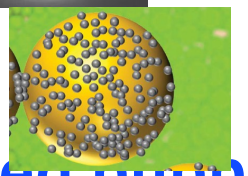
Vesicles ,cells, nuclei

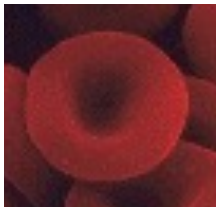
Polymersomes

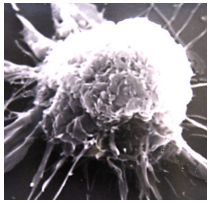
Pickering emulsions

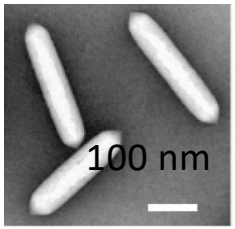
Gas vesicles ,protein coated bubbles

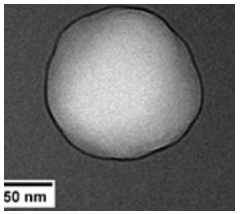


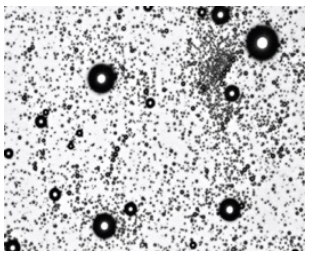












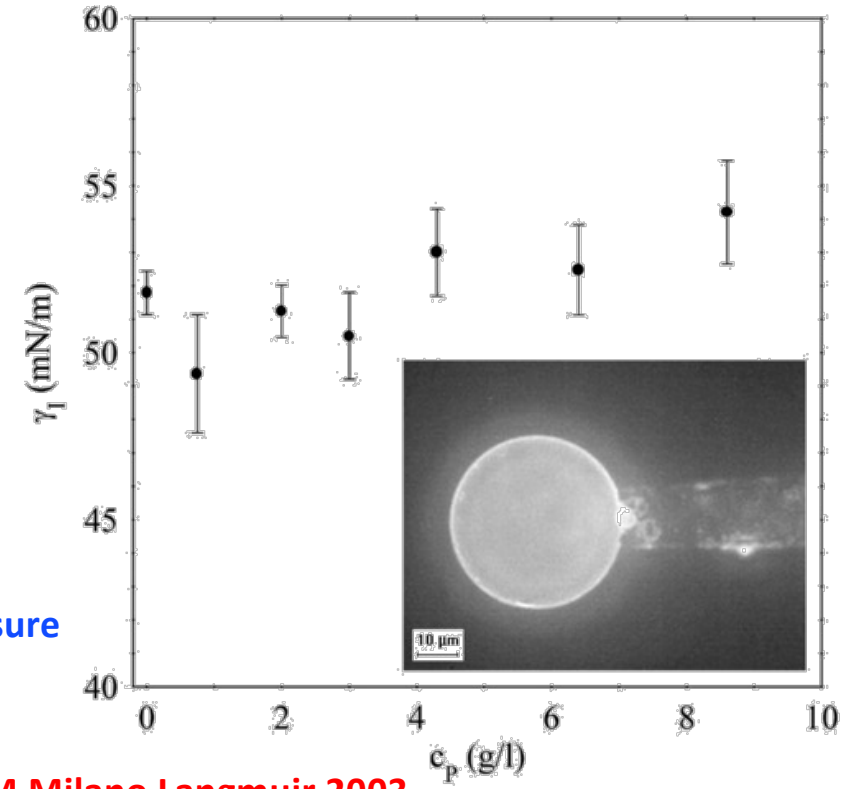
Pipette aspiration of oil in water pickering droplets (silica colloids d=500nm)

$$\gamma_1 = \gamma_0 - \pi$$

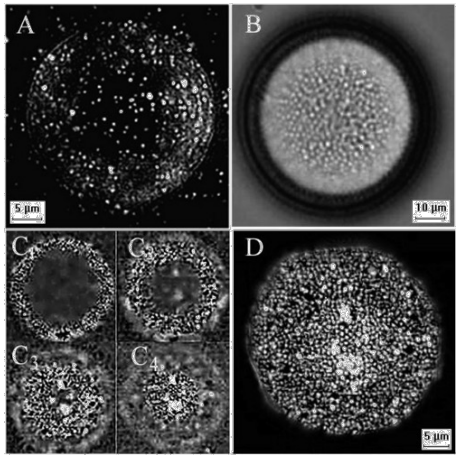
$$\pi = cs\ kT$$

$$\Delta P_C = 2\gamma\left(\frac{1}{R_p} - \frac{1}{R}\right)$$

threshold aspiration pressure



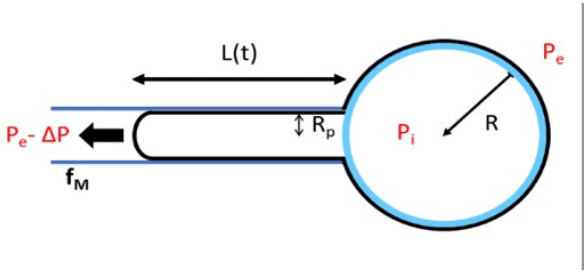
E.Vignati R.Piazza INFM Milano Langmuir 2003



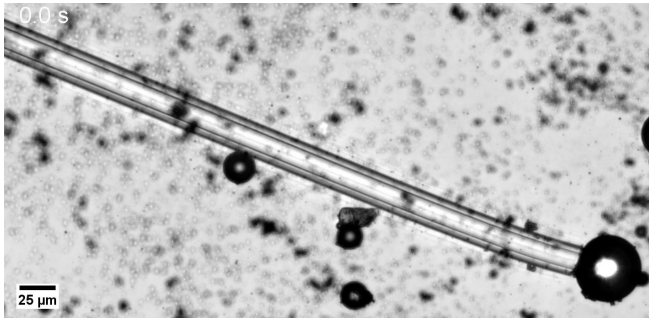
Microscopie images of pickering droplets

A epifluorescence
B bright field
C Z scan
D 3d reconstruction

Aspiration of ultra-rigid bubbles: gas extraction regime



$$\sigma_y > \Delta P > \frac{2\gamma}{R_p}$$



$$f_M = \pi R_p^2 \left[\Delta P - \frac{2\gamma}{R_p} + 2\frac{\sigma_0}{R}\right]$$

$$\dot{L} = \frac{R_p^2}{8L_t\eta}\left(\Delta P - \frac{2\gamma}{R_p}\right)$$

$\Delta P > \frac{2\gamma}{R_p}$, ~18 kPa for R_p = 7 µm and γ = 64.5 mN m^{-1}.

tongue of gas expends.

$\dot{L}$ = 200 µm s^{-1}

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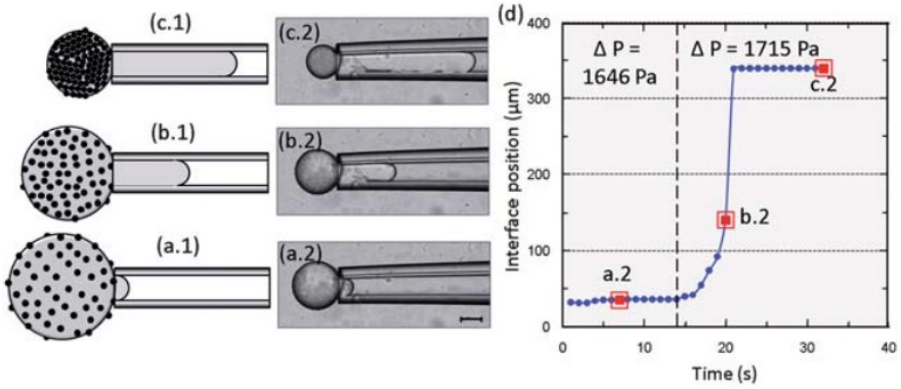
Extraction of oil from pickering droplet

T.Spicer (Procter and Gamble) Soft matter 2011



Coalescence in Pickering emulsions

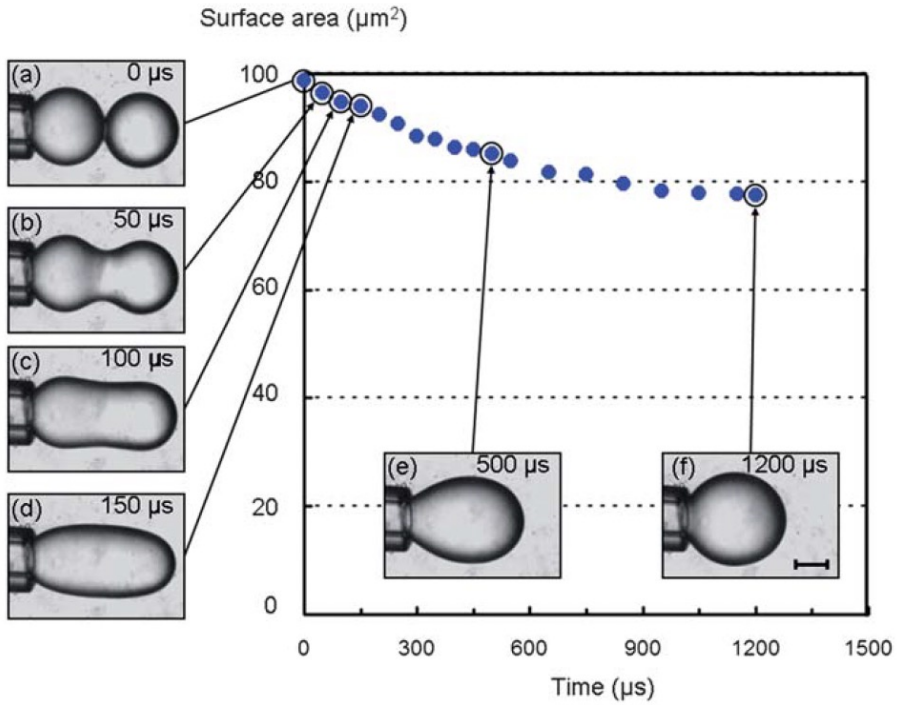


Fig. 1 Microphotographic montage of the coalescence dynamics between two hexadecane droplets and plot of the % change in the total surface area (100% being the total surface area of two droplets) against time as the coalescence proceeds. Images (b)–(e) represent intermediate microscopic images of coalescing droplets. The scale bar is 50 μm.

T.Spicer (Procter and Gamble) Soft matter 2011

Arrested Coalescence in Pickering emulsions

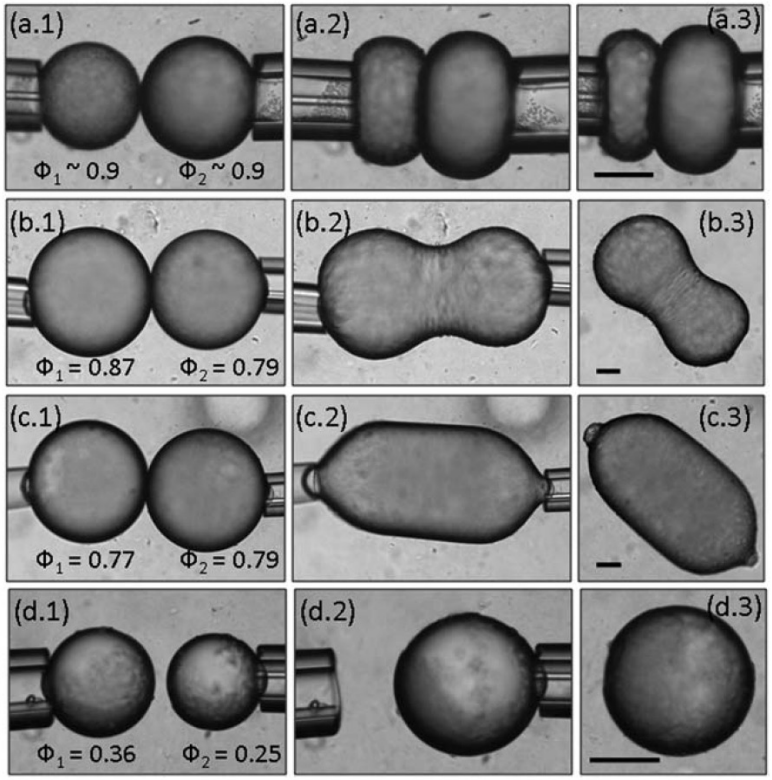


Fig. 5 Coalescence behavior as a function of the droplet surface coverage. (a) Total stability, (b) and (c) arrested coalescence, and (d) total coalescence of Pickering droplets. Scale bars = 50 μm. Please refer to the ESI† for coalescence movies.

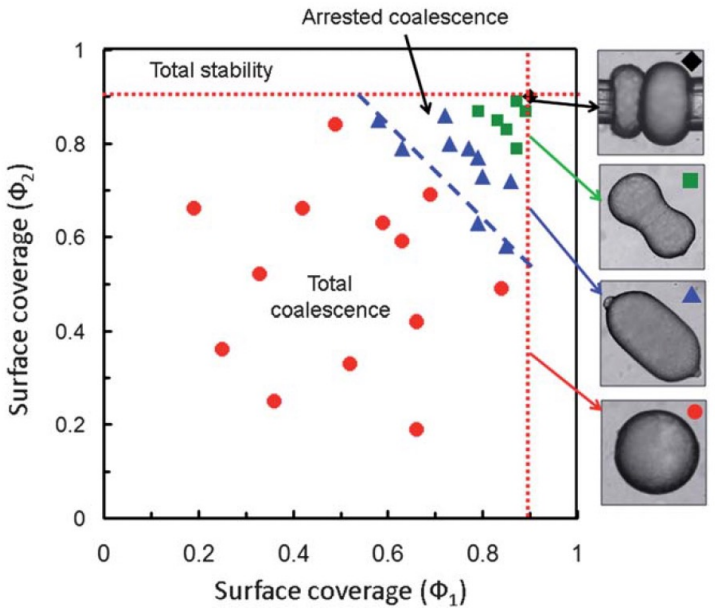


Fig. 6 Different coalescence regimes (total coalescence, arrested coalescence and total stability) as a function of the droplet surface coverage. The dashed line indicates the surface coverage condition ($\phi_1 + \phi_2 = 1.43$). The dotted lines indicate the maximum surface coverage that the droplets can possess. Since ϕ_1 and ϕ_2 are interchangeable, the data is symmetrical.

a result of total coalescence between two droplets (radii R_1 and

T.Spicer (Procter and Gamble) Soft matter 2011