Electronic Supplementary Material (ESI) for Soft Matter

Supplementary material

1 Raw data of the conductivity

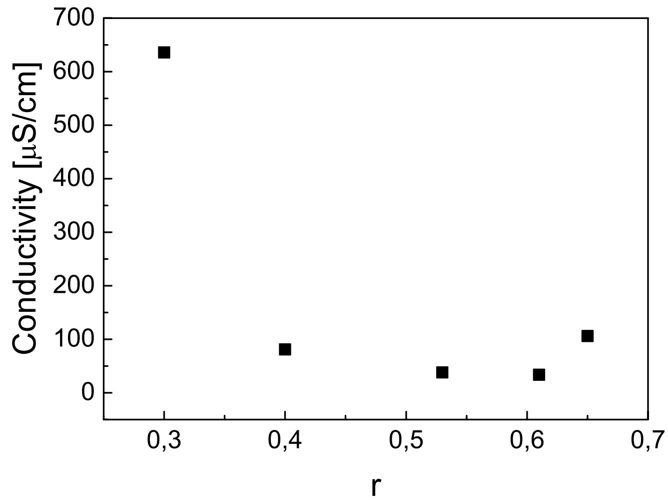

Figure 1: *Conductivity of pure catanionic solutions at different ratio of anionic surfactant r.*

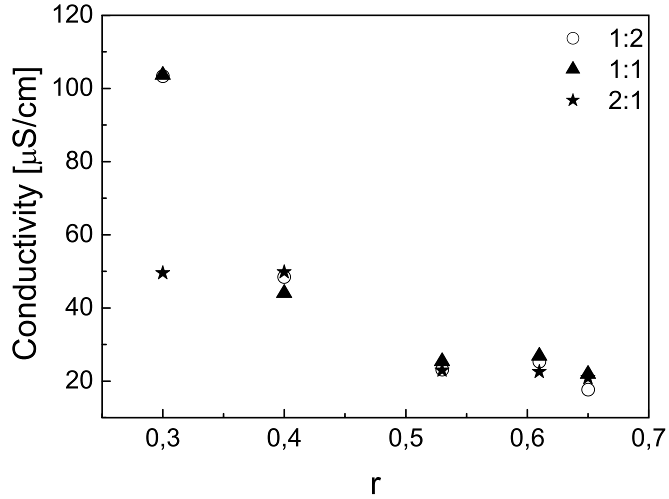

Figure 2: *Conductivity of emulsions as a function of the r-ratio of the catanionics at different oil/ catanionic solution ratios.*

2 Calculation of the surface tension for catanioncs adsorbed at the air-water interface

$$\sigma_{r,A} = \sigma_{r,A}(dispersion) + \sigma_{r,A}(polar) \quad (1)$$

and

$$\sigma_{r,T} = \sigma_{r,A} + \sigma_{T,A} - 2\sqrt{\sigma_{r,A}(dispersion)\sigma_{T,A}(dispersion)} \quad (2)$$

where $\sigma_{T,A} = \sigma_{T,A}$(dispersion) and $\sigma_{T,A}$(polar)=0.
The surface tension of tetradecane is $\sigma_{T,A}$=26.6 mN/m and the interfacial tension of tetradecane-water is $\sigma_{T,W}$=52.9 mN/m.
From equation 2 it follows that $\sigma_{r=0.4,A}$(dispersion)= 21.3±1 mN/m, $\sigma_{r=0.4,A}$(polar)= 3.7±1 mN/m, $\sigma_{r=0.6,A}$(dispersion)= 22.7±1 mN/m, and $\sigma_{r=0.6,A}$(polar)= 3.3±1 mN/m.
Finally from equation 3,[1]

$$\sigma_{r,W} = \sigma_{r,A} + \sigma_{W,A} - 2\sqrt{\sigma_{r,A}(dispersion)\sigma_{W,A}(dispersion)} - 2\sqrt{\sigma_{r,A}(polar)\sigma_{W,A}(polar)} \quad (3)$$

where $\sigma_{W,A}$(dispersion)=21.5 mN/m and $\sigma_{W,A}$(polar)=50.4 mN/m, one can calculate $\sigma_{r=0.4,W}$= 26.8±1 mN/m and $\sigma_{r=0.6,W}$= 27.9±1 mN/m.

References

[1] Binks, B.; Clint, J. H. *Langmuir* **2002**, *18*, 1270–1273.