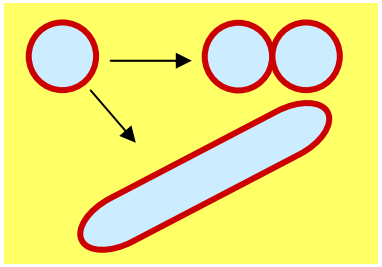

Aggregation and shape transformation in w/o microemulsions

W.F.C. Sager

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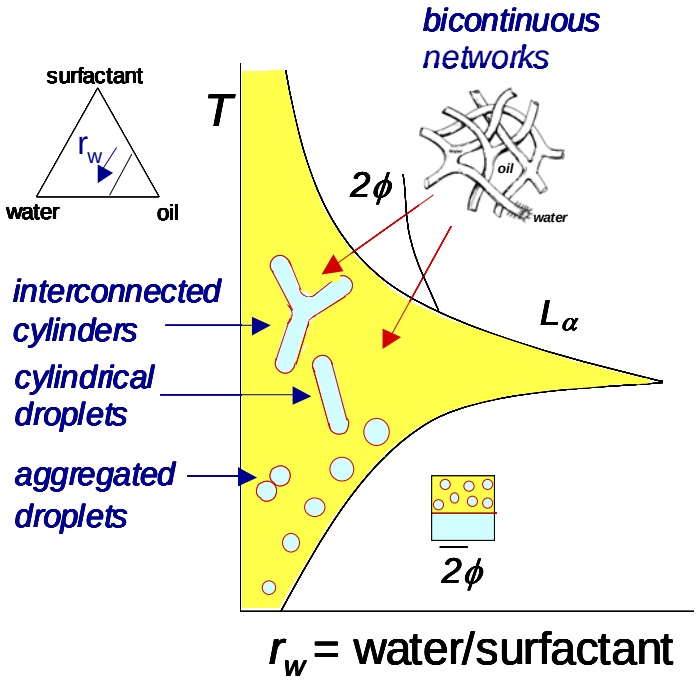
w/o microemulsion existence region on the oil-rich side



Structural transitions in microemulsions have intensively been studied both experimentally and theoretically over the last 2 decades, but have due to their complexity so far hardly been addressed in a quantitative manner. For ionic surfactants, the interfacial surfactant film becomes less curved towards water, initiating droplet aggregation within the one-phase region of the water-in-oil (w/o or L_2-)phase, and a **sphere→cylinder→interconnected network transition**. By performing an extended small angle X-ray scattering study on the temperature evolution in AOT/water/oil microemulsions we were for the first time able to analyse droplet interaction and cylinder formation separately and to quantify the **sphere/cylinder coexistence**. The same characteristic trends were found by treating cylinder formation and droplet aggregation theoretically within the framework of the Helfrich free energy. Currently we are studying the transitions to **wormlike reversed micelles** in nonionic w/o microemulsions.

more …

- **SAXS** → *J Chem Phys 113, 1651*
- **Curvature energy** → *J Chem Phys* 111, 7062 (droplet aggregation)
  → *J Chem Phys* 115, 1073 (cylinder formation)
- **Phase behaviour** → *Langmuir 11, 977*