## Spontaneous Emulsification of water in oil at appreciable interfacial tensions

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Spontaneous formation of aqueous droplets in kerosene was observed, which was facilitated by the presence of an oil soluble surfactant: Span<sup>®</sup> 80 at concentrations above CMC. Kerosene/ water interfacial tension under all conditions studied was not lower than 4 mN/m. Therefore, ultra-low interfacial tension was not required for this process to occur spontaneously as is usually required [1]. The process was caused by a transfer of water molecules to swollen reversed micelles. The influence of both the surfactant concentration in the organic phase and NaCl concentration in the aqueous phase on spontaneous aqueous droplet formation was investigated. Nano-sizing analyse of the drops was performed, which showed the droplets sizes in between 100 and 400 nm. It is proven that the presence of salt in the aqueous phase inhibits droplet formation. It is shown that big sessile aqueous droplets deposited on a hydrophobic substrate inside the kerosene phase were dissolved in kerosene through formation and growth of droplets, which form an aqueous film at the droplet base.



Figure. Formation of a cloud of nano-sized droplets and a film at the droplet base assisted by swollen reverse micelles present in the organic phase (kerosene)

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## References

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