

Worms, droplets, and vesicles: manipulating self-assembly pathways of betaine surfactants with additives

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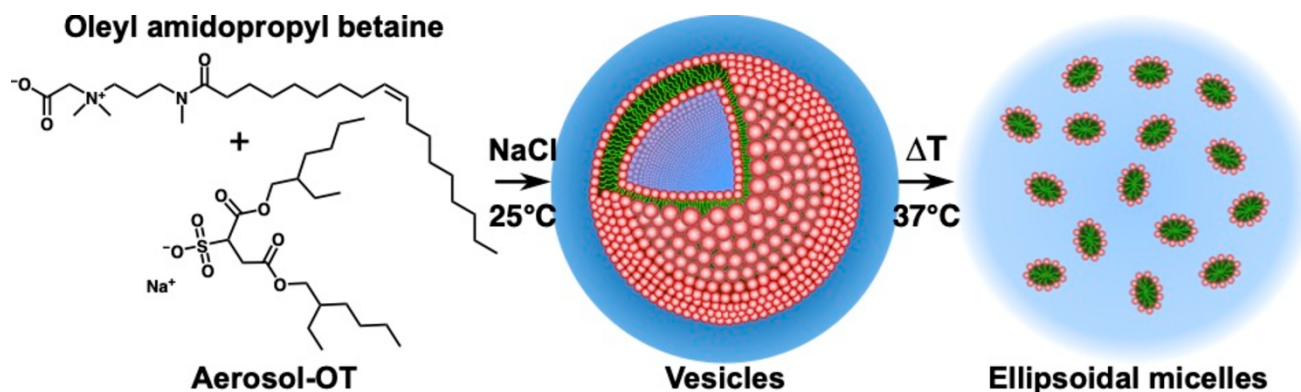
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Zwitterionic betaine surfactants are found to exhibit highly tunable self-assembly behaviour, offering a versatile platform for controlling structure and function in complex fluids. Here, we showcase how simple additives - varying from small organic molecules to salts and co-surfactants - alter self-assembly pathways in aqueous oleyl amidopropyl betaine systems. Resultant structures vary from wormlike micelles, to microemulsions, vesicles and more. Small-angle neutron scattering, including contrast variation with selective deuteration, is used extensively to resolve structural evolution and additive partitioning across length scales, and uncover the key interactions in play.

Keywords:

Surfactants, self-assembly control, additives, small-angle neutron scattering.



Schematic of the aqueous vesicle assembly of two well-known surfactants, and their thermal response at physiological temperature.

References:

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