Compositional Ripening of Particle and Surfactant Stabilised Emulsions

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When β-ionone-in-water emulsions are mixed with squalane-in-water emulsions, the slightly water-soluble, mobile β-ionone undergoes mass transfer to the drops of highly water-insoluble, immobile squalane. We have investigated this compositional ripening process for emulsions stabilised by either particles or surfactants. For particle-stabilised emulsions the swelling of the particle-stabilised emulsion drops triggers limited coalescence which causes ratio between the initial and final swollen droplet radii to be proportional to the swelling ratio to the power of 1. Surfactant-stabilised emulsions swell without coalescence which causes the ratio between the initial and final swollen droplet radii to be proportional to the swelling ratio to the power of 1/3. Addition of excess non-adsorbed particles to the particle-stabilised emulsions suppresses the swelling-triggered coalescence and causes a system behavioural switch from particle like to surfactant like.