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The Interplay of Osmotic Transport and Coalescence on Stability of Double Emulsions WANG YAFEI, Beijing Normal University, China, ZHANG TAO, Nanjing University, Nanjing, China, HU GANG, Hong Kong Baptist University, Hong Kong SAR, China — The long-term stability and controlled release of encapsulated active materials are major concerns of important applications of double emulsions. Only recently can stable monodisperse W/O/W double emulsions be made with a controlled size and internal volume fractions of encapsulated aqueous phase. The size of uniform oil droplets can be varied from sub-micron to tens of microns. Conventional dynamic light scattering encounters significant difficulties to probe the internal microstructure of liquid droplets. The droplets-inside-droplets structure of double emulsions complicates the interpretation of scattering data. To probe the internal microstructure of liquid droplets, diffusing-wave spectroscopy shows a unique advantage to measure the restricted motion of internal aqueous droplets. The destabilization of double emulsions can be initiated by introducing osmotic unbalance between the inner and outer aqueous phases and the process of coalescence transfers a double emulsion into a simple emulsion. Light scattering is a powerful technique to study the kinetic process by probing the structure migration. Diffusing-wave spectroscopy is also used to monitor the aging of double emulsions on a time scale of one year.

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