Elasticity index of condensed suspension and emulsion using passive microrheology

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Emulsion has been used in various ways in our daily life. Compared to the suspension, emulsion is defined as a mixture of two immiscible fluids and the surface of the droplet in emulsion has soft properties. By this microscopic difference, systems' macroscopic property changes dramatically.

To compare the suspension and emulsion, we use 1-eicosene wax suspended in water system. 1-eicosene has melting point at 24.6℃ and by just changing the temperature the system changes from soft to hard or vice versa. In this presentation, we focus on the microscale elastic behavior of condensed wax emulsion system gained from Diffusing Wave Spectroscopy.

In passive microrheology, one could monitor the systems' evolution and restructuration after shearing and detect nascent destabilization of the microstructure by non-intrusive way. In short time scale, droplets move as free particles and in long time scale, MSD reaches to plateau reflecting the elasticity of system. Elasticity index, EI is defined as inverse of the plateau height of MSD and as the volume increases, both emulsion and suspension's EI increases but the tendency is different resulting from the surface difference.