

Abstract Submitted
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Effect of Amphiphiles on the Rheology of Triglyceride Networks

JYOTI SETH, Indian Institute of Technology Bombay — Networks of aggregated crystallites form the structural backbone of many products from the food, cosmetic and pharmaceutical industries. Such materials are generally formulated by cooling a saturated solution to yield the desired solid fraction. Crystal nucleation and growth followed by aggregation leads to formation of a space percolating fractal-network. It is understood that microstructural hierarchy and particle-particle interactions determine material behavior during processing, storage and use. In this talk, rheology of suspensions of triglycerides (TAG, like tristearin) will be explored. TAGs exhibit a rich assortment of polymorphs and form suspensions that are evidently sensitive to surface modifying additives like surfactants and polymers. Here, a theoretical framework will be presented for suspensions containing TAG crystals interacting via pairwise potentials. The work builds on existing models of fractal aggregates to understand microstructure and its correlation with material rheology. Effect of amphiphilic additives is derived through variation of particle-particle interactions. Theoretical predictions for storage modulus will be compared against experimental observations and data from the literature and micro structural predictions against microscopy. Such a theory may serve as a step towards predicting short and long-term behavior of aggregated suspensions formulated via crystallization.

Jyoti Seth
Indian Institute of Technology Bombay

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