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Branching, Superdiffusion and Stress Relaxation in Surfactant Micelles[1] R. SURESHKUMAR, S. DHAKAL, Syracuse University, SYRACUSE UNIVERSITY TEAM — We investigate the mechanism of branch formation and its effects on the dynamics and rheology of a model cationic micellar fluid using molecular dynamics (MD) simulations. Branched structures are formed upon increasing counter ion density. A sharp decrease in the solution viscosity with increasing salinity has long been attributed to the sliding motion of micellar branches along the main chain. Simulations not only provide firm evidence of branch sliding in real time, but also show enhanced diffusion of surfactants by virtue of such motion. Insights into the mechanism of stress relaxation associated with branch sliding will be discussed. Specifically, an externally imposed stress damps out more quickly in a branched system compared to that in an unbranched one. References: Dhakal and Sureshkumar, J. Chem. Phys. 143, 024905 (2015); ACS Macro Letters, 5, 108-11 (2016).

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R. Sureshkumar
Syracuse University

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