

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Rheological and tribological study of complex soft gels containing polymer, phospholipids, oil, and water BARBARA FARIAS, LILIAN HSIAO, SAAD KHAN, North Carolina State University — Oil-in-water emulsions with polymers are widely used for personal care products. Since the accumulation of traditional surfactants on the skin can promote irritation, an alternative is the use of hydrogenated phosphatidylcholine (HPC), a phospholipid that can form a lamellar structure similar to the skin barrier. This research aims to investigate the effect of composition on the rheological and tribological characteristics in complex systems containing HPC. For tribology experiments we used a soft model contacts made of polydimethylsiloxane (PDMS), while for bulk rheology studies we used dynamic and steady shear experiments. We examine how the addition of polymer, HPC and oil affects friction coefficients, lubrication regimes, viscoelasticity, yield stress, and gel formation. The bulk rheology shows that the studied systems are shear thinning and have gel-like behavior. The effect of each component was investigated by going from simple to more complex systems. The Stribeck curves obtained are related to the bulk rheology results to obtain physical insights into these complex systems. The results suggest that the polymer and phospholipids are being adsorbed onto the PDMS surface, reducing the friction coefficient at lower entrainment speeds.

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Date submitted: 16 Nov 2016

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