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Surfactant and Protein Foams: Differences in Drainage and Rheology

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We report results on drainage and rheology of aqueous foams made either with small classical surfactants, or large protein molecules, or the mixture of these 2 compounds. These chemicals provide different mechanical conditions at the surfaces of the bubbles, as well as different thin film structures. We have evidenced differences in foam drainage and mechanical properties. Bulk and surface rheology, multiple light scattering techniques (static and dynamic modes), thin film microscopy have been used to extract information at all the length scales within the foam, allowing us to eventually find the origins of the different macroscopic behaviors. Different drainage regimes have been found, illustrating the important role of the interfacial mobility within the foam skeleton (channels and nodes). For rheology, the thin film structure is important: thick gelified protein films provide complementary storage and loss contributions, resulting in more brittle foams. The case of the mixture illustrates complex interfacial adsorption competition between small and large molecules.

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