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# *Phase-separated surfactant monolayers: Exploiting immiscibility of fluorocarbons and hydrocarbons to pattern interfaces.*

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*Abstract:*

The mutual immiscibility of hydrogenated and fluorinated surfactants at interfaces frequently leads to phase-separation, which provides a useful and flexible method for patterning air-water and solid-air interfaces. In this article, we review recent advances in the use of hydrogenated-fluorinated surfactant mixtures to achieve interfacial patterning. For even relatively simple systems comprised of binary mixed monolayers of hydrogenated and perfluorinated fatty acids, a diverse range of film morphologies can be generated at the air-water interface and successfully transferred onto solid substrates. Systematic investigations reported over the past several years have allowed for correlation between the chemical structure of the film constituents with the gross film morphology and underlying crystalline structure of the films. Early thermodynamic models based on the interplay between dipole-dipole repulsion forces between charged headgroups balanced by line tension between phases that were formulated to describe phase-behaviour in simple phospholipid monolayer systems, have proven highly useful to describe morphologies for the immiscible surfactant blends. Beyond simple binary fatty acid mixtures, highly-structured films have also been reported in mixed phospholipid systems, which have found important application in controlling the physical, compositional and performance properties of lung surfactant mixtures, as well as in