

## **482e Drying and Swelling of Surfactant Films**

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The desorption or sorption (drying or swelling, respectively) of water by amphiphiles have great fundamental value (e.g., interplay between solvent diffusion and self-assembled nanostructure) and technological interest (e.g., shelf-life and dissolution of detergent or pharmaceutical powders and tablets, drying of coatings containing surfactants or hydrophilic polymers, evaporation-induced material synthesis). In our studies we expose films containing polyethoxylated surfactants to air of controlled relative humidity, and monitor the water loss/gain over time until equilibrium is reached. The equilibrium water concentration data are presented in the form of an adsorption isotherm and are further analyzed in conjunction with data on the spacing between self-assembled structures (obtained from small-angle scattering) to reveal intermolecular interactions [Gu & Alexandridis: *Macromolecules* 2004, 37, 912]. The data on the time course of water loss/gain by the surfactant films are fitted with a model that accounts for water diffusion in the film and evaporation at the surface, in order to assess the relative importance of diffusion and evaporation under various conditions, and to extract diffusion coefficients for water in the film, as a function of surfactant type and concentration [Gu & Alexandridis: *J. Pharm. Sci.* 2004, 93, 1454; *Langmuir* 2005, 21, 1806].