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Dynamics of surfactants spreading on gel layers: cracking and pattern formation[1] CONSTANTINE SPANDAGOS, SHERMIN AKHTAR, PAUL LUCKHAM, OMAR MATAR, Imperial College London — The spreading of surfactant droplets on gel layers is observed to be accompanied by "starbursts" resembling cracking patterns on the gel surface. Marangoni stresses induced by surface tension gradients between the spreading surfactant and the underlying gel layer are identified to be the driving force behind these phenomena. A parametric study that involves different surfactants on various gels aims to investigate the ways that system parameters such as the surfactant chemistry and concentration and the gel type and strength can affect the morphology and dynamics of the cracking patterns. The surfactants used in this study include SDS (Sodium Dodecyl Sulphate) and the "super-spreader" Silwet L-77 (a Trisiloxane ethoxylate); the different gel substrates are made of agar and gelatine. The instability asscociated with the cracking on the surface of the gels is characterised in terms of the number of "arms" that forms and of their mean length as a function of time. Qualitative information on the surfactant distribution and gel topography, where the patterns are formed, is also obtained.

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