

Abstract Submitted
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Engineering and control of surfactant-laden flows: experiments and MD simulations¹ NINA KOVALCHUK, University of Loughborough, PANAYIOTIS THEODORAKIS, ERICH MULLER, RICHARD CRASTER, Imperial College London, VICTOR STAROV, University of Loughborough, OMAR MATAR, Imperial College London — The dynamics of surfactant-laden flows remain full of surprises. For hydrophobic substrates with a water contact angle of less than 110° , certain types of surfactants, known as *superspreaders*, can lead to an increase in the spreading factor by two orders of magnitude over water droplets; spreading takes place with speeds between 1-10 mm/s. The superspreading effect occurs provided the concentration of superspreaders is above the critical wetting concentration (CWC), which, in turn, exceeds (by several times) the critical aggregation concentration. The CWC is dependent on the type of surfactant but independent of the nature of the substrate. In this study, we use a combination of molecular dynamics simulation, and direct experimentation to analyse the spreading behaviour of well-known superspreaders. We correlate this behaviour in terms of the physicochemical properties of the surfactant (sorption kinetics, aggregation formation, and dynamic surface tension).

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