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Reactive Spreading and Recoil of Oil on Water ERNST VAN NIEROP, HOWARD STONE, Division of Engineering and Applied Science, Harvard University — Droplets of oil containing oleic acid were observed to spread, then recoil, on an aqueous solution of sodium hydroxide. Surfactant is produced at the interface during spreading, and spreading is observed to be much faster (radius $R(t) \propto t^{\alpha}$ with $0.64 < \alpha < 0.89$) than what would be expected in the absence of a chemical reaction. It is observed that when using higher concentrations of reagents, spreading is faster and the maximum radius achieved is larger. Drops reach a maximum radius after $t \sim 10 - 60$ s with $R_{max} \sim 3.1 - 4.2$ times the initial radius, after which they are observed to recoil slowly with apparent power-law behavior ($-0.34 < \alpha < -0.14$). The fast spreading dynamics require reagent concentrations of order $\mathcal{O}(1$ mM).

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