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Marangoni flow induced by alcohol deposition on a water film FEDERICO HERNANDEZ-SANCHEZ, ANTONIN EDDI, JACCO SNOEIJER, University of Twente — Bringing the interfaces of two miscible fluids into contact naturally generates strong gradients in surface tension. Here we investigate such a Marangoni-driven flow by continuously supplying isopropyl alcohol (IPA) on a film of water, using microdrops of IPA-water mixtures. These droplets create a localized depression in surface tension that leads to the opening of a circular hole in the water film, with water being collected in a growing rim at the edge of the hole. The dynamics of the thin film is monitored experimentally using high-speed imaging. We find that the radius of the hole opens as $r \sim t^{1/2}$. This result can be explained from a balance between Marangoni and viscous stresses, assuming that the gradients in surface tension are smoothened out over the entire size of the hole. We derive a scaling law that accurately predicts the influence of the IPA flux as well as the thickness of the thin film at the interior of the hole.

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