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Delayed Coalescence of Sessile Droplets with Different but Miscible Liquids STEFAN KARPITSCHKA, HANS RIEGLER, Max Planck Institute of Colloids and Interfaces, D-14476 Potsdam, Germany — Due to capillary forces, two sessile droplets of miscible liquids will fuse when they contact each other. Usually the droplet fusion proceeds very fast, delayed mostly by viscous forces. However, quite unexpected, it was observed recently[1] that the coalescence of sessile droplets of completely miscible liquids can be delayed up to minutes. After a first contact, the droplets remain separated by a thin liquid neck and push each other across the substrate before they finally merge. The delayed coalescence may be highly relevant for technical applications, for instance in the sector of semiconductor manufacturing, where controlled contact line displacement is a key technology. It is assumed that the coalescence is delayed by a Marangoni convection through the thin film connecting the drops. This suggests that the effect is quite common. A sharp transition from fast to delayed coalescence was found[2] as the difference in surface tensions exceeded $\approx 4\,\mathrm{mN/m}$, irrespective of other liquid properties like absolute surface tensions or viscosities. We present new experimental results addressing the dynamics of the liquid neck between the drops from which we can distinguish various coalescence modes.

[1]H. Riegler, P. Lazar, *Langmuir* **24**, 6395 (2008).
[2]S. Karpitschka, H. Riegler, *Langmuir* **26**, 11823 (2010).

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