Surface chemistry induced droplet dynamics

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We present an experimental study of droplet motion induced by a surface energy gradient created by patterned self-assembled monolayers of hydrophobic molecules. Using standard lithographic tools we create well-defined patterns consisting of alternating hydrophobic and hydrophilic stripes. By changing the relative widths of the stripes, a gradient is formed changing from predominantly hydrophobic to mostly hydrophilic. The well-defined patterns enable analysis of the motion of the droplets with respect to the combination of the patterns it is in contact with at a given moment. Moreover, we quantitatively investigate the effect of controlled variations in the stripe patterns on the droplet speed. The speed of the contact lines is discussed in terms of forces generated by the underlying pattern.

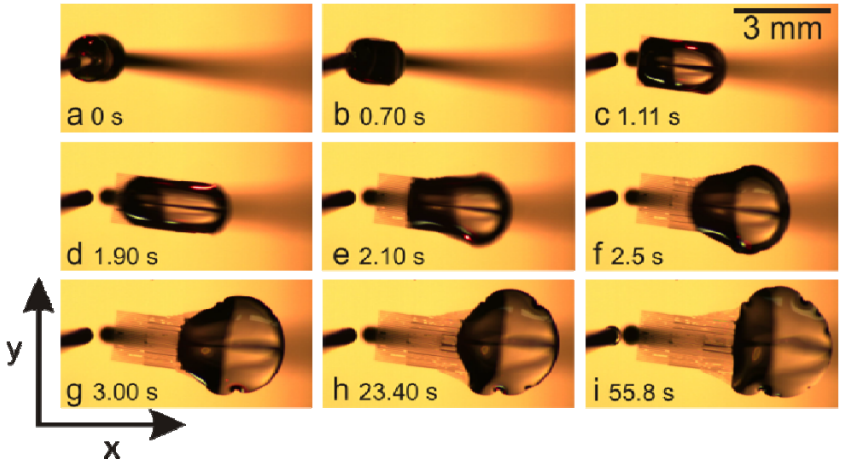

Fig. Top-view snapshots showing the motion of a droplet over the gradient patterned surface.

Reference(s)

[1] O. Bliznyuk, E. Vereshchagina, E.S. Kooij, and B. Poelsema, *Physical Review E*, **79**, 041601 (2009)
[2] O. Bliznyuk, H.P. Jansen, E.S. Kooij, and B. Poelsema., *Langmuir*, **26**, 6328 (2010)