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Electric field induced deformation of sessile drops[1] LINDSEY CORSON, University of Strathclyde, Glasgow, UK, COSTAS TSAKONAS, Nottingham Trent University, Nottingham, UK, BRIAN DUFFY, NIGEL MOTTRAM, University of Strathclyde, Glasgow, UK, CARL BROWN, Nottingham Trent University, Nottingham, UK, STEPHEN WILSON, University of Strathclyde, Glasgow, UK —
The ability to control the shape of a drop with the application of an electric field has been exploited for many technological applications including measuring surface tension, producing an optical display device, and optimising the optical properties of microlenses. In this work we consider, both theoretically and experimentally, the deformation of pinned sessile drops with contact angles close to either 0° or 90° resting on the lower substrate inside a parallel plate capacitor due to an A.C. electric field. Using both asymptotic and numerical approaches we obtain predictive equations for the static and dynamic drop shape deformations as functions of the key experimental parameters (drop size, capacitor plate separation, electric field magnitude and contact angle). The asymptotic results agree well with the experimental results for a range of liquids.

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