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How surface nanodroplets sit on a microlens IVAN DEVIC, University of Twente, SHUHUA PENG, RMIT Melbourne, HUANSHU TAN, DETLEF LOHSE, University of Twente, XUEHUA ZHANG, RMIT Melbourne and University of Twente — Wetting of micro-patterned surfaces is of the great interest in the fundamental research and many practical applications such as open microfluidics, metal corrosion, pesticide spray and water collection. In this work, we investigate nanodroplets, partially wetting a flat surface and partially wetting a spherical surface (spherical microlens) which has a small contact angle with the flat surface. We have developed a theoretical approach for minimising the free surface energy of the nanodroplet at the rim of microlens and have also connected to data from experiments. Since the diffusion length scale is long enough for nanodropets to obtain quasi-static shape in our experiments, with our approach we are also able to obtain growing or shrinking dynamics of the nanodroplet in this system. Of particular interest is behaviour of the contact angle of nanodroplet on the spherical surface of microlens. We find that contact angle of the minimum free surface energy shape deviates more from Young's angle as the nanodroplet gets smaller compared to the spherical microlens, while contact angle of larger drops asymptotically approaches Young's angle. Theoretical results partially agree with our experimental data, due to the surface heterogeneity of both substrates in our experiments.

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