

On the coalescence of sessile drops with miscible liquids

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ABSTRACT

Sessile drops sitting on highly wettable solid substrates fuse in different ways after contact, depending on the surface tension gradients between the mixing droplets. In early time evolution the drop coalescence can be fast or delayed. In long time evolution a secondary drop formation can occur. We study numerically droplet dynamics during coalescence in two and three spatial dimensions, within a phase field approach. Beneath pattern formation, the shape of the flow field and concentration distributions are in detail investigated. We discuss criteria to distinguish different coalescence regimes. The geometry of the contact line between the two perfectly miscible liquids changes much from 2D to 3D description. The influence of the third spatial dimension is analyzed and a comparison with recent experiments will be done.

REFERENCES

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