

Coalescence Dynamics of Two Liquid Droplets

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Abstract

We present an experimental study on the coalescence of a falling droplet with a stationary sessile droplet on a solid surface under isothermal condition. High speed video images are presented to show coalescence dynamics, shape evolution and contact line movement. The contact line movement is found related to the change of local dynamic contact angle and evolution of free surface. The motion of contact line also affects the evolution of spread length, which is the length along the centers of the two droplets. Experimental observations show that the spread length could be larger or smaller than ideal spread length, which is the spread diameter of individual droplet plus the center-to-center spacing of the two droplets. Three coalescence mechanisms are observed and identified comparing maximum and minimum spread lengths to the ideal spread length during coalescence.

Key words: droplet, impact, coalescence, spread length, contact line, contact angle

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