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Liquid transfer between two solid surfaces with the effect of contact angle hysteresis HUANCHEN CHEN, TIAN TANG, Department of Mechanical Engineering, University of Alberta, ALIDAD AMIRFAZLI, Department of Mechanical Engineering, York University — Drop transfer from one solid surface to another (e.g. due to the approach of a surface from top to a sessile drop resting on a lower surface) is widely observed in many industrial areas, e.g. offset printing. This process is governed by many factors such as the contact angle (CA) and contact angle hysteresis (CAH) of surfaces, viscosity of the liquid and the rate at which the donor and acceptor surfaces are separated. In this work, an experimental apparatus is developed to study the transfer of liquid drop between surfaces, with the particular focus on addressing the effect of the surfaces' CAH when the loading speed is low (transfer is quasi-static). In the experiment, a liquid bridge between the two surfaces is first formed by compression; then stretched to the point of breakage. By using surfaces that have similar CA but dissimilar CAH, the liquid transfer ratio (the amount of liquid transferred to the acceptor surface over the total amount of liquid) is found to be significantly influenced by CAH. In addition, as a result of CAH, the maximum compression of the liquid bridge is found to play an important role in determining the transfer ratio. These findings can be very helpful for the design of surfaces and loading conditions to achieve desired transfer ratios in practice.

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