

Abstract Submitted
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Experimental study of the Marangoni flow in evaporating water droplet placed on vertical vibration and heated hydrophobic surface¹
CHANG SEOK PARK, HEE CHANG LIM, PUSAN National University — In general, the heated surface generates a Marangoni flow inside a droplet yielding a coffee stain effect in the end. This study aims to visualize and control the Marangoni flow by using periodic vertical vibration. While the droplet is evaporating, the variation of contact angle and internal volume of droplet was observed by using the combination of a continuous light and a DSLR still camera. Regarding the internal velocity, the PIV(Particle Image Velocimetry) system was applied to visualize the internal Marangoni flow. In order to estimate the temperature gradient inside and surface tension on the droplet, a commercial software Comsol Multiphysics was used. In the result, the internal velocity increases with the increase of the plate temperature and both flow directions of Marangoni and gravitational flow are opposite so that there seems to be a possibility to control the coffee stain effect. In addition, the Marangoni flow was controlled at relatively lower range of frequency 30 ~ 50Hz.

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