

Abstract Submitted
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The Effect of Surface Wettability on Viscous Film Deposition A.

HERESCU, J. ALLEN, Michigan Tech. U. — The viscous deposition of a liquid film on the inside of a capillary has been experimentally investigated and the relationship between the film thickness and surface wettability was examined. With distilled water as a working fluid tests were run in a 500 microns diameter glass tube with less than 30 degrees and 105 degrees contact angle. The thickness h of the deposited film was then estimated from the liquid mass flow rate exiting the capillary and the gas-liquid interface (meniscus) velocity, and compared with Taylor's data and with modified Bretherton's correlation as a function of the Capillary number. In a different set of experiments direct film thickness measurements were obtained by matching the refractive index of the capillary with that of the investigated fluid. The tube was also placed in an index-matched view box to minimize distortion and allow for accurate evaluation of the film thickness. The results were checked against data resulting from the aforementioned procedure. The thickness measurements as well as the meniscus velocity were determined with the aid of a Photron high speed camera with 10000 frames per second sampling capability coupled with a Nikon TE-2000 inverted microscope.

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