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**Dynamic wetting of a liquid film in a vertical hydrophobic tube** PASCALINE HAYOUN, ETIENNE BARTHEL, FRANCOIS LEQUEUX, EMILIE VERNEUIL, Physico-chimie des Polymères et Milieux Dispersés, UMR 7615, FRANCK PIGEONNEAU, Surface du Verre et Interfaces, UMR 125 CNRS/Saint-Gobain, ALBAN LETAILLEUR, JEREMIE TEISSEIRE, Saint-Gobain Recherche — The drop of a liquid plug through a tube occurs for instance in vending machine. In such a system, the fouling is linked to the creation of the liquid film at the rear of the liquid plug. Consequently, the conditions leading to the film creation are important to know. We study numerically the dynamic wetting transition of a liquid plug undergoing gravity on hydrophobic surface in a vertical tube. Using a lubrication theory, the liquid film thickness obeys the mass conservation equation with a volume flow rate depending on the relative motion of the tube, capillary and gravity forces. An ad hoc friction at the triple line is used to take into account the wetting dynamics. The lubrication equation is solved using a finite difference technique in space and a time integrator for stiff system with an adaptive time step. The numerical results are compared to experimental data. The complex film morphology due to the transients and the critical slowing down at the dynamic transition are reproduced. However, several experimental features are not predicted numerically especially the width of the transition. Our preliminary calculations suggest that the dispersion relation of the liquid film mode can explain the discrepancy.

Franck Pigeonneau

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franck.pigeonneau@saint-gobain.com

Surface du Verre et Interfaces, UMR 125 CNRS/Saint-Gobain

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