



TRANSIENT PHENOMENA OF DYNAMIC CONTACT ANGLE IN MICRO CAPILLARY FLOW

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ABSTRACT: This study is devoted to investigate the dynamics of liquid driven by capillary force in a tube. A micro particle image velocimetry (μ PIV) system was used to visualize the meniscus movement and the contact angle. The experiments were carried out with water-glycerin solution having viscosity ranging from 0.16 to 1.50 Pa·s as the test liquid in borosilicate glass tube with inner diameter of 200 μ m. The flow times of the meniscus in variable viscosity were compared with the numerical solutions. From the experiments, the transient motions were observed during the filling process for liquids with different viscosity. The numerical solution considering the time-variation of the contact angle agrees well with the experimental data. Especially, the higher viscosity material has less error than the lower viscosity material in the simulation. In order to make the effect of inertial force clear at inlet of the tube, the detailed meniscus movement is measured at earlier stage.

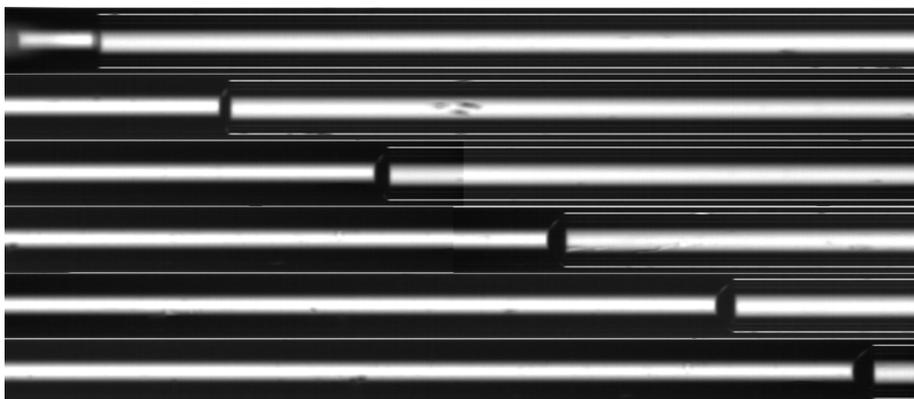


Fig. 1 Variation of meniscus shape inside capillary tube