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Numerical Investigation of Slot Die Coating Based on VOF Method

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Abstract : In the process of preparing thin films by chemical solution method, the uniformity of gel coating has a great influence on the subsequent film thickness. Based on a coating device, the research tracks the interface development of gas-liquid flow by volume of fluid method (VOF). The effects of fluid viscosity and wall wetting property for the shape and position of the coating window are discussed in the process of slot die coating. The result shows that downstream contact lines gets closer to the corner with the increase of fluid viscosity. When the viscosity increases from 0.2Pa•s to 0.3Pa•s, 18.2% of the vortex region area will be reduced. With the static contact angle of upper die head surface (θ_sd) increasing, X_u decreased gradually which cause the instability changes of upstream surface. Also, θ_sd increasing brings the reduction of vortex region.

Keywords : film growth, vortex, VOF, slot die coating
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