

Flow dynamics and stability in curtain coating flow

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Flow dynamics and stability in slot-fed and slide-fed curtain coating processes have been theoretically scrutinized using 1D and 2D models. 1D simplified viscocapillary models have been derived from lubrication approximation developed by Kistler and Scriven and Jung et al. Using these equations, curtain flow behavior has been successfully predicted depending on the various process condition. Especially, singularity problem occurring in 1D models has been effectively eliminated by determining the curtain angle at the singularity point in the curtain flow region. Also, instability occurring in the curtain flow region, which is characterized by periodic oscillation of the coating variables, has been examined using linear stability method. It has been noted that results by 1D models quantitatively agree with those by 2D calculations.