

Analysis of slot coating flows under periodic disturbances

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Slot coating can produce thin functional films in electronics industries, e.g., optical films and battery electrodes. It is a pre-metered method, where the final film thickness is determined by the production speed and the feeding rate, and independent of other process conditions or material properties at steady state. Therefore, it can control the produced film thickness precisely.

Among various types of disturbances in slot coating process, temporal variations in the coating gap, or gap disturbance, is identified as the most dangerous one regarding the film thickness uniformity. In this study, a theoretical model is developed to understand the underlying mechanism of thickness variations in response to the gap disturbance, and the theoretical predictions are compared with the computational results from the finite element slot coating model.