FLOW OF DISPERSIONS IN COATING DIE GEOMETRIES

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Abstract

Particle-fluid coating dispersions may exhibit aggregation inside slot coating dies within particular ranges of shear rate, which is responsible for some defects of thin-coated film products. Aggregation phenomena have been observed for particle dispersions flowing through narrow gaps in a radial flow cell and glass slot coating dies. Flow visualizations of dispersed systems at relatively low particle concentrations (up to 10 wt%) provide a relationship between aggregation and shear rate. Operating windows have been developed as functions of slot die gap and the particle volume fraction. Aggregation was observed for very small gaps (50 μm) at low particle concentrations (3 wt%) for very low shear rates, and at particle concentration of 10 wt% below shear rates as high as $360s^{-1}$.