G01.11

# Mixing of Pigmented Polymers in a Co-rotating Twin-Screw Extruder

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Simulation results for mixing of two different color polymers in a co-rotating twin-screw extruder are presented. Velocity distribution predicted by a three-dimensional simulation of the flow is used to predict the change in the distribution of initially segregated particles. In a stationary frame of reference, the geometry of flow domain in a twin-screw extruder is continuously changing with time. Therefore, the predicted velocity distribution cannot be used to trace the path lines in such a frame of reference. However, the geometry of the twin-screw extruder is time independent in the reference frame moving along the axial direction with a constant velocity V = LN towards the exit, where L is the screw lead and N is the rotational speed in revolution per second. In this moving frame of reference, the predicted velocity distribution was used to trace the path lines of 1,000 particles in the co-rotating twin-screw extruder. The predicted particle distribution was used to estimate a Shannon entropy based color homogeneity index. As expected, the color homogeneity index is found to increase with flow along the co-rotating twin-screw extruder. Also, it is observed that the color homogeneity index decreases as the bin size, that is, the area of observation, is refined.