

Rheokinematics for Product Development – Formulation Screening in Rotational Rheometers

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Abstract

Product formulations for industrial processes are typically developed at lab-scale. However, the mixing conditions are not easily mimicked in the lab. A rotational device is proposed in this work as a fast lab-scale formulation development, which enables mimicking the mixing conditions in the industrial process. The geometrical configurations of the rotational device are from rheometry devices (plate-plate and cone-plate). The main advantages of this method are the small amounts of raw materials, and shorter testing times. This methodology is applied to an industrial case study, the Reaction Injection Moulding (RIM) process. The mixing length scales evolution in the rotational rheometer were matched to those in RIM machines. The main novelty of this work is the introduction of a protocol that bridges the processing conditions at lab using small amounts of raw materials to high throughput continuous flow reactors.

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