

Optimal shim design for uniform coating distribution in slot coating process

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Slot coating process is one of the most commonly used methods in order to manufacture a variety of products in displays and secondary batteries. In this system, it is quite important to design internal slot die optimally for ensuring the uniform velocity profile at die exit. As the strategy for optimal die design, it is possible to change flow patterns through the chamber and the slit inside the die, considering rheological properties of coating liquids which are typically non-Newtonian. The research plan is first to examine in detail how shim geometries have a great influence for the flow dynamics inside the die for non-Newtonian liquids, without changing die structure. 3-dimensional flow characteristics inside the die were numerically analyzed via CFD computations using different shim designs. It was found that the fairly non-uniform velocity profile at the die exit under the basic shim condition could be obviously smoothed by the modification of shim geometry.

Keywords: Slot die coating, Internal flow, Shim geometries