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INVESTIGATION OF PROCESS CONDITION EFFECTS ON OPTICAL PROPERTY IN INJECTION COMPRESSION MOLDING

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Injection compression molding (ICM) has been employed in the production of optical parts since this process can improve optical property by reducing flow-induced residual stress and warpage deformation. In this study, a true 3D simulation technology based on finite volume method has been used to simulate viscoelastic behavior of melt in ICM process and optical properties of products. The simulations are performed with a model of spherical lens to investigate process condition effects, such as compression gap and compression speed effects on birefringence, residual stress and warpage results in ICM process. In addition, the conventional injection molding (CIM) process is also simulated using the same model and its results are compared with those from ICM. Furthermore, the ICM experiments are conducted and the optical properties of the products are examined using photoelasticity technique. The experimental results are compared with those from the simulations to validate this ICM simulation technology.