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Analysis on Shrinkage Error Compensation in Injection Molding of Aspheric Plastic Lens

*Chao-Chang A. Chen, Shu-Ling Tzeng, Shi-Chi Kao

Department of Mechanical Engineering, National Taiwan University of Science and Technology, Taipei, Taiwan 106

This research is to integrate the moldflow analysis into the compensation of Z-axis deformation or warpage due to shrinkage of plastics for mold insert in injection molding of aspheric lens. Taguchi method is used to run experimental design for identifying the significant factors on injection parameters for minimum Z-axis deformation. Mold temperature was found as the most significant factor to the warpage. Moreover, the conic fitting method was used to find out the compensation curve for deformation from the moldflow results. The compensation curve of error is a feedback to the design profile in 3D-CAD software. The compensated lens is imported into the moldflow analysis software again to verify the converge of warpage on deformation. Results show the shrinkage error improvement ratio (SEIR) is 85 % and the feasibility of the developed method which can be further used in integrating with the machining error of mold insert to reduce the time and cost in molding aspheric lens.

Keywords: Aspheric lens, Shrinkage error compensation, Injection molding, Moldflow analysis