Development of Plastic Injection Molding Using the LIGA Process

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Abstract

Plastic injection molding was conducted with a mold cavity mounting a precision Ni stamper, which was fabricated by the LIGA process. The used molding materials were PC, TPX and POM in consideration of applications in the optical, medical, and mechatronics fields. In order to evaluate high aspect ratio microstructures fabricated by plastic injection molding, the microstructures were measured about molding material filling, mold release, shaping accuracy, and transferability. In a test pattern having lines and spaces, each material filled the bottom of a stamper having a height of 100 μm and a line width of 20 μm. In a test pattern including posts and gear teeth, materials filled the bottom of a stamper having 300 μm in height. Measured surface roughness of both the stamper and the molded products was several tens of nm, which was a sufficient transferability for practical application using plastic injection molding.

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