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Fabrication of Glass Microlens Array using Laser-Assisted Contactless Hot Embossing

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Abstract

Contactless hot embossing is one promising replication-based method for fabrication of high quality microlens array (MLA) with different sag height but suffers long thermal cycle. Herein, rapid fabrication of glass MLA using laser-assisted contactless hot embossing process is proposed. CO_2 laser irradiation that passes through the micro holes mold promotes surface heating at the glass surface and speed up the formation of spherical MLA. The effect of the laser irradiation conditions, preheating temperature and holding time to the formation of MLA was discussed. Finally, high aspect ratio and smooth spherical glass MLA array with different sag height were successfully fabricated.

Keywords: Microlens array (MLA); Optical glass; Contactless hot embossing; Laser-irradiation.