Contactless Molding of Arrayed Chalcogenide Glass Lenses

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Abstract

The moldable chalcogenide glass material has been developed recently. This study developed a new process to roduce an arrayed chalcogenide glass lenses by a ntactless molding process, which is considered to have a reat potential for the mass production of arrayed glass lenses with low cost, ease of manufacture and free of urface defects. The stainless steel plate with arrayed through holes was employed as the molds. The selenium based chalcogenide glass plate was put on the mold and nitrogen gas was introduced into the closed chamber to allow gas pressure up to 4 kg/cm2. IR heating allows the chalcogenide glass plate to approach the soft point, and forces glass flows into the arrayed through holes to form the arrayed glass lenses by viscoelastic deformation. A higher forming temperature, pressure and longer time duration tend to produce the arrayed lenses with a higher peak height and a smaller radius of curvature. The arrayed chalcogenide glass lenses with a peak height of 430 μm can be obtained at a forming temperature of 305 °C, a gas pressure of 1 kg/cm2 and a time duration of 110 s. The contactless gas assisted molding system can avoid contact induced glass sticking and gas bubble problems. The surface qualities of molded lenses are much better than that of lenses molded by the traditional contact molding process.

Keyword：Contactless molding;Chalcogenide glass; Arrayed lenses; Viscoelastic deformation