Molding of Al2O3-coated chalcogenide glass lenses

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Abstract

Glass with a low transition temperature (Tg) has the advantage of extending the service life of molding dies. However, low Tg glasses normally demonstrate poor chemical durability and scratch resistance. The molding of low Tg chalcogenide glasses is very challenging due to their fragile and unstable characteristics. This research tried to deposit a very thin layer of aluminum oxide on chalcogenide glass-preforms using a water-based sol-gel process. High temperature glass molding experiments were carried out to investigate the high temperature interfacial
reaction between the coated glass gobs and the WC/Co substrate. It was found that surface defects appearing on the molded glass lenses were mainly due to the interfacial chemical reaction between the chalcogenide
glass and molds, which leads to a low yield of molded glass lenses than expected. In the case of Al2O3 coated glass-preforms, no reaction products were detected on the surfaces of the molded lenses after the molding test. The surface qualities and yield were significantly improved.

Keyword：sol-gel coating; Al2O3; chalcogenide glass; glass molding.