Effect of Al2O3 Coated Glass Preform on Glass-Mold Sticking Behaviour

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Abstract

Molding of low Tg glasses with high refractive index (nd) is a very tough work due to the existence of high concentration of active elements in glasses. This research tried depositing very thin layer of aluminum oxide (~20 nm) on various low Tg glass-preforms (with nd > 1.80) by water based sol-gel process, to improve glass sticking with mold materials. High temperature glass wetting and molding test were carried out to investigate the high temperature interfacial reaction between the coated glass gobs and mold materials.
The contact angle was decreased with increasing heating duration at soft point (Sp), when the uncoated glass-preforms were brought in contacted with WC/Co (3%), Owing to the severe interfacial chemical reaction, all transparent glasses were gradually turned translucent or opaque and severe sticking with mold materials. In the case of Al2O3 coated glass-preforms, the variation of the contact angles were very limited, and most of them presented no sticking and no wetting behavior. It was found out the acceptable molding temperature range is very narrow for molding uncoated low Tg glasses even with Pt-Ir film on mold surface. The molding conditions become more flexible for using glass perform with Al2O3 film on the

surface, and the surface qualities of molded glass lenses was improved at the same time. The
optical transmission of those lenses molded from the coated glass-preforms exhibited no or
very little changes after the molding process at a moderate molding temperature.

Keyword：Al2O3 Coated Glass, sticking, molding, wetting