

# Design of Protective Coatings for Glass Lens Molding

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## Abstract

The glass molding process is considered to have a great potential for the mass production of aspherical glass lenses with high precision and low cost. However, glass molding has a serious problem of mold sticking with glass which needs to be resolved. This research investigates the interface reaction between glass and mold by high temperature wetting experiment, which provides the reference for the designing anti-stick coatings. The SUMITA K-PSK200 optical glass gobs with low T<sub>g</sub> were used in this study. The influence of operation temperature, ambient gas, substrate materials, and thin film composition on wettability of glass at high temperature were studied. The results show that the higher the temperature, the smaller the wetting angle between glass gob and substrate could be observed. This indicates that severe interface chemical reaction occurred and resulted in the loss of transparency in glass appearance. The wetting experiment in nitrogen ambient improved the sticking situation. The combination of chemically stable substrates and coatings, such as Sapphire (substrate) / GaN (film) and Glass (substrate) / Al<sub>2</sub>O<sub>3</sub> (film) can achieve the best antistick propose. The precious metal films, such as Pt, Ir, coated on the ceramic substrates can effectively reduce the interface reaction between the glass and substrates.

Keyword : glass molding, coatings, wetting, interface reaction.