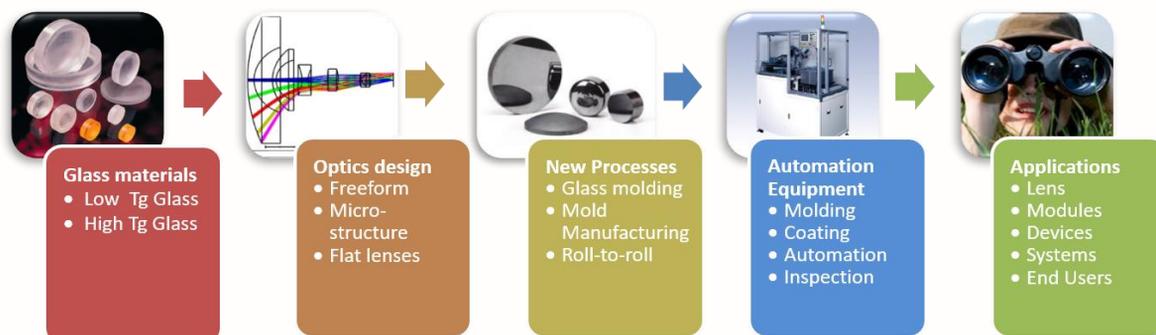


Precision Glass Molding – For scalable manufacturability



Introduction

Chalcogenide material is gradually taking over Germanium in the broad IR regime. It performs especially well within the 8 to 12 μ m range due to its lowest absorption and dispersion in LWIR. The low dn/dT of Chalcogenide makes lens athermalization much simpler by removing required mechanical compensation complexity. The Chalcogenide series of glasses can be processed by moulding. While polished/machined glass lens requires more than 1 hour per piece, the moulding process is reduced to 5 mins.

Operation Principle

The overall manufacturing capability is listed in Figure 1. (1) A precision glass moulding manufacturing recipe has been developed for both low and high transition temperature glasses. With more than 10 years' experience in optics design, the capability could be extended to free-form optics design and microstructured optics design. (2) The automatic lens inspection system will check the optical performance right after the moulding process. (3) Depending on the target applications, versatile thin-film coating will be applied. Applications include broadband transmission, high power lasers, automotive headlight diffusers, etc.



Figure 1. Samples with moulded ChG glass

The key specifications of a typical precision glass moulding machine can be found in Table 1. For other general specifications such as coating and profile control, please refer to WOE laser optics/IR optics/biomedical optics catalogues.

Ultra-low Tg glasses for Tg<400 °C	
Glass material	infrared glass, PbO-based glass
Mold material	stainless steel, optical-grade aluminum alloy, electroless nickel
Mold machining	Diamond turning
Mold life	<1000 pieces
Low Tg glass Tg<650 °C	
Glass material	Oxide-based glass
Mold material	Tungsten carbide
Mold machining	Ultra-precision grinding
Mold life	<10000 pieces

Table 1. Key specifications of precision glass moulding

Applications

With higher optical quality, high temperature resistance and thermal stability, corrosion resistance, scratch resistance and wide refractive index, precision moulded glass could be used in various industry sectors as suggested in Figure 2.



Figure 2. Application of precision moulded lens etc.

Conclusion

As a global enterprise, leading photonics innovation since 2002, WOE has built up customization engineering capability for free form optics and glass moulding.

