

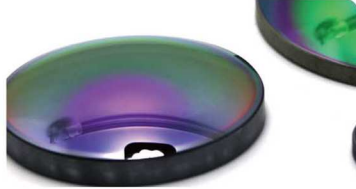
THE HYPERION DIFFERENCE ASPHERICS CAPABILITIES

TRENDING ASPHERES ACROSS THE SPECTRUM

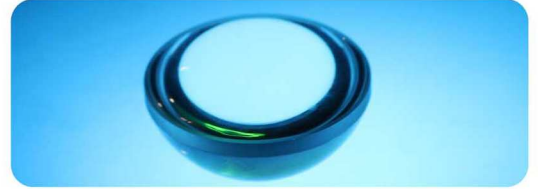
Understanding market trends is critical to serving the photonics community. Hyperion regularly listens to customers to gain market insight and improve its value offering. In recent years, there is increasing demand for precision-grade aspheres to create more compact, high-performance optical systems ranging from VIS imaging systems to LWIR applications.



ZnSe DOE



Ge Asphere



Glass Asphere

In parallel, Hyperion has invested in upgrading our aspherical manufacturing capabilities. Specifically, after acquiring Ametek's full liquid-proof accessories in 2017, we are able to fabricate aspherical and DOE components in **Ge, ZnS, ZnSe, CaF₂, Chacolgenide** and more. Our in-house SPDT machine is capable of turning **glasses & fused silica aspheres**, which can be an effective element in complex imaging lens groups and diffraction-limited system designs.

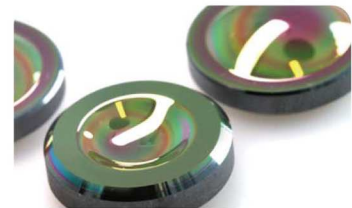
HYPERION'S PRECISION ASPHERE FABRICATION

Over the past 5 years, we have accrued extensive manufacturing experience in the aspherical category and have perfected our ability to yield high-precision aspheres with accuracy. Below highlights a few of our key capabilities:

1. IR Aspherical Lenses

(MWIR, LWIR Applications, Via a 2-4 Lens Structure with One DOE Surface)

- ◆ **ZnSe, Germanium, Silicon** aspherical lenses with MWIR BBAR coating, $R_{avg} < 1\%$ through 3-5 μ m
- ◆ **Germanium, Silicon, Chacolgenide** aspherical lenses with LWIR BBAR coating, $R_{avg} < 1\%$ through 8-14 μ m. DOE surface is available, on either Ge or Chacolgenide components.



2. VIS-NIR Aspherical Component

- ◆ We work with **Schott, Ohara, CDGM**, and **NHG** brand glasses for singlet aspherical collimator design, with PV better than 0.5 μ m across clear aperture up to 120mm
- ◆ Full capability of in-house AR coating throughout the VIS-NIR spectrum



Glass Asphere



Bi-asphere



Ascylindrical

HYPERION'S PRECISION ASPHERE FABRICATION

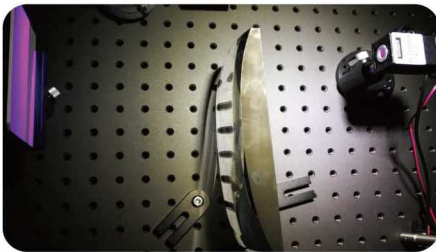
3. Bi-aspherical Surfaces Components

- ◆ With advanced positioning and alignment metrology, we can produce two aspherical surfaces on one singlet; with PV better than 0.3um across clear aperture within 1"



4. AI, Holographic, and HUD Applications

- ◆ We work with a great number of clients in AI, holographic, and Head-up Display (HUD) industries by developing off-axis parabolic mirrors on substrates such as glass, fused silica, and Schott Zerodur
- ◆ Meeting and exceeding 1/4L across $\varnothing 240\text{mm}$ on a spherical surface, while having the aspherical surface meeting a PV value $< 2.5\mu\text{m}$



Holographic Components



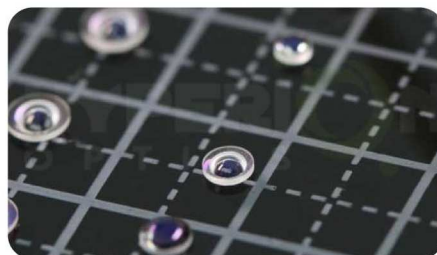
Off-Axis Parabolic Mirrors

5. Aerospace applications

- ◆ Extensive experience in working with **Schott Zerodur** material, an excellent zero expansion material selection in space applications
- ◆ Hyperion's in-house HR coating capability enables a one-stop shop experience for paraboloids and off-axis parabolic mirrors



Zerodur Components



Miniature Asphere

6. Miniature & Crystal Aspherical Lenses

- ◆ We produce miniature aspherical lenses as small as 3.5mm in diameter, 5mm acylindrical lenses for fast-slow axis laser diodes collimating applications, we also work with **MgF2, BaF2, CaF2** crystal materials.

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