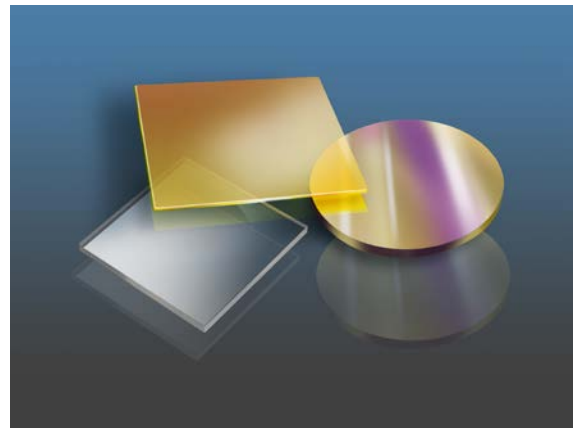




## WHITE PAPER: Finished Infrared Optics Start with the Best Materials

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Optical products, traditionally used for visible light tasks, are moving aside to make room for more specialized optical components that are being manufactured for use in ultraviolet (UV) and infrared (IR) systems. To meet the more demanding specifications for infrared optics, PG&O engineers are now working with a variety of high-performance IR materials in varying sizes and configurations. Selecting and working with the finest infrared materials is essential to delivering high-performance results.



The following materials have been selected by PG&O to meet growing customer requests for optically-clean, polished IR materials. IR optics are used extensively in a wide variety of applications, including military/defense, biomedical, industrial, surveillance systems, automotive, fire control, lasers, night vision, thermal imaging, and many more.

- **Calcium Fluoride (CaF<sub>2</sub>)** is an optical crystal that is used in telescopes for astronomy as well as optical windows, IR lenses, prisms, and analytical equipment.
- **Germanium (Ge)**, a versatile crystalline IR material, is increasingly used in imaging systems and optical components such as lenses, prisms, and filters for thermal imaging and spectroscopy applications.
- **Magnesium Fluoride (MgF<sub>2</sub>)** transmits from the ultraviolet through the visible and out to the midwave infrared (MWIR) spectrum. A tough material that polishes well, it can be used in laser cavity optics. It's also well suited for lenses, windows, and polarizers that don't need antireflection (AR) coatings.

- **Silicon (Si)** is commonly used for near-infrared transmission due to its low cost, low dispersion, and low density. The low density also makes it ideal for use in weight-sensitive applications, particularly in the 3 to 5  $\mu\text{m}$  (midwave-infrared) waveband.
- **Zinc Selenide (ZnSe)** is another material that is widely used for infrared windows, lenses, and other IR optics. It is safe to use in many environments, including laboratories, in the field, and for a multitude of industrial tasks.
- **Zinc Sulfide (ZnS)** features extraordinary hardness and is often applied to tasks that must withstand harsh environments, such as military applications. It is an ideal choice for IR transmitting applications in the 8 to 12  $\mu\text{m}$  (longwave-infrared) range.

For more information about Precision Glass & Optics' infrared materials and finished IR optics, please call 714-540-0126.