

ZGP Single Crystals

Chemical Formula:	ZnGeP₂
Crystal Symmetry:	Tetragonal
Optical Symmetry:	Uniaxial positive ($n_e > n_o$)
Class:	42m

Zinc germanium phosphide (ZGP) has outstanding fundamental properties as a mid-infrared nonlinear crystal. It is especially suitable for high average power applications throughout the infrared region. The large nonlinear coefficient of ZGP, which is approximately 160 times that of KDP, makes it one of the most efficient nonlinear crystals known.

Recent improvements in growth of ZGP at Inrad Optics have led to the ready availability of large (>25 mm), high quality crystals with low absorption in the infrared. ZGP crystals grown at Inrad Optics typically have an absorption coefficient(α) that is less than 0.1 cm⁻¹ in the 1.9 μ m to 2.6 μ m region and below 0.03 cm⁻¹ from 2.6 μ m to 8.4 μ m.



Features

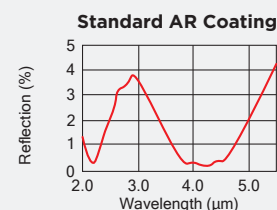
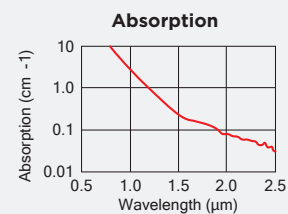
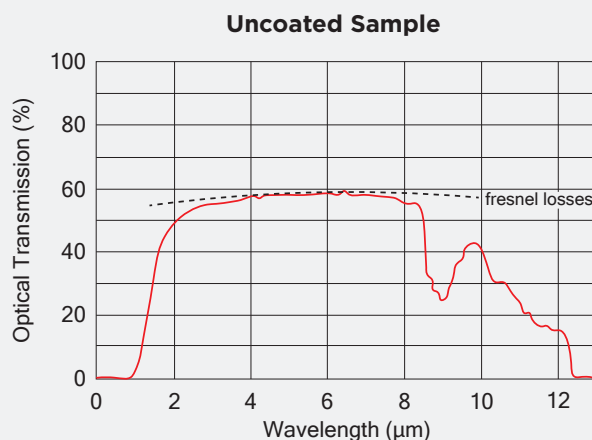
- Large nonlinear coefficient
- Broad optical transparency from 1 to 12 μ m
- Phase matchable over a broad spectral region
- High thermal conductivity
- High laser damage threshold
- Good mechanical properties

Applications

ZGP excels in nonlinear applications in the mid-infrared region, operating within a temperature range from -40 to 180°C. These applications include:

- Optical parametric oscillators (OPO)
- Second harmonic generation (SHG)
- Fourth harmonic generation (FHG)

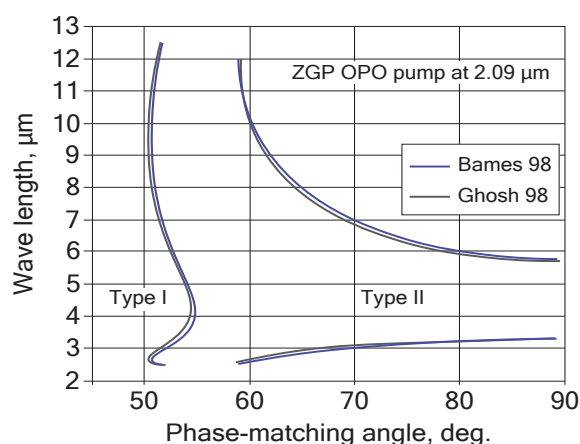
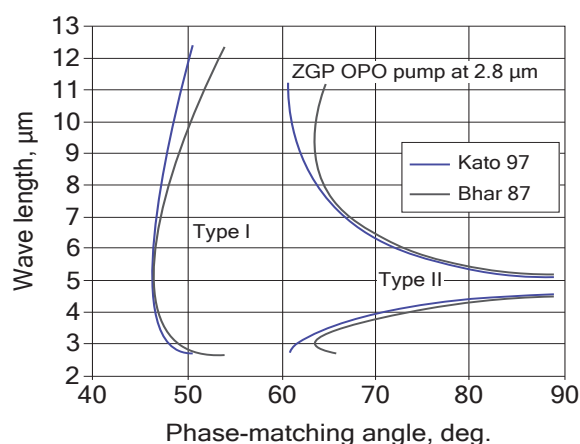
Typical Transmission Spectrum



Ordering Information

- **Sizes.** Standard cross sections are 6 x 8 mm and 8 x 12 mm and crystal lengths are 12 to 25 mm. Other cross sections and lengths are available on request.
- **Orientation.** For OPO applications, specify Type I or Type II, and the phase match angle, θ . Orientations of finished crystals are accurate to within 0.5 degrees.
- **Finishing.** Specify the overall optical wedge desired for the finished crystal. Crystals can be fabricated with a 30 arcminute wedge in the non-tuning direction to limit etaloning effects. If no wedge is requested, parallelism can be held to 3-5 arcminutes. Scratch/dig is 10/5.
- **Coatings.** OPO crystals can be AR coated. Specify pump wavelength and tuning wavelength regions and desired reflectivity values. For SHG crystals specify fundamental wavelength.

Tuning Curves



ZGP Single Crystals - Standard Orientations			
Type I, Angle θ	Operation	Size	Coating Description
55°	OPO with 2.09 μm pump	6 x 8 x 12 mm	AR 2.09 μm / 3.5 - 5 μm
		6 x 8 x 15 mm	
		6 x 8 x 20 mm	
		6 x 8 x 25 mm	
		6 x 12 x 12 mm	
		6 x 12 x 15 mm	
		6 x 12 x 20 mm	
		6 x 12 x 25 mm	