

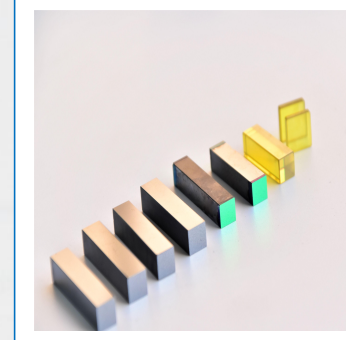
## ZnGeP<sub>2</sub>(ZGP)

ZGP crystals possessing large nonlinear coefficients ( $d_{36}=75\text{pm/V}$ ), wide infrared transparency range( $0.75\text{-}12\mu\text{m}$ ), high thermal conductivity( $0.35\text{W}/(\text{cm}\cdot\text{K})$ ), high laser damage threshold ( $2\text{-}5\text{J}/\text{cm}^2$ )and well machining property, ZnGeP<sub>2</sub> crystal was called the king of infrared nonlinear optical crystals and is still the best frequency conversion material for high power, tunable infrared laser generation.

We can offer high optical quality and large diameter ZGP crystals with extremely low absorption coefficient  $\alpha < 0.05 \text{ cm}^{-1}$ (at pump wavelengths  $2.0\text{-}2.1 \mu\text{m}$ ), which can be used to generate mid-infrared tunable laser with high efficiency through OPO or OPA processes.

### Applications:

- Second, third, and fourth harmonic generation of CO<sub>2</sub>-laser.
- Optical parametric generation with pumping at a wavelength of  $2.0 \mu\text{m}$ .
- Second harmonic generation of CO-laser.
- Producing coherent radiation in submillimeter range from  $70.0 \mu\text{m}$  to  $1000 \mu\text{m}$ .
- Generation of combined frequencies of CO<sub>2</sub>- and CO-lasers radiation and other lasers are working in the crystal transparency region.

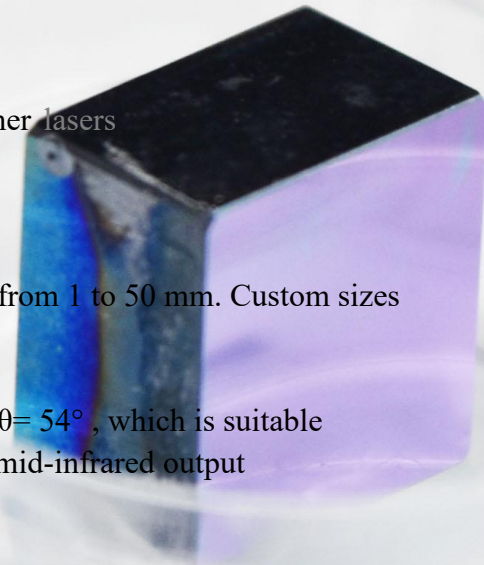


### Dimensions:

Standard cross sections are  $6 \times 8\text{mm}$ ,  $5 \times 5\text{mm}$ ,  $8 \times 12\text{mm}$ . Crystal length range from 1 to 50 mm. Custom sizes are also available on request.

### Orientation:

The standard ZGP crystal orientation is for type I phase matching at an angle of  $\theta=54^\circ$ , which is suitable for use in OPO pumped at wavelengths between  $2.05\mu\text{m}$  and  $2.1\mu\text{m}$  to generate mid-infrared output between  $3.0\mu\text{m}$  and  $6.0\mu\text{m}$ . Custom orientations are available on request.

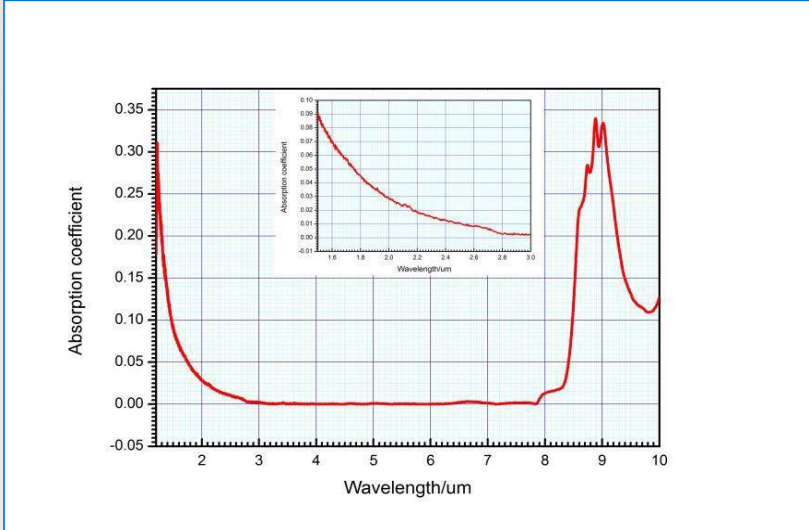


### Basic Properties

Chemical	ZnGeP <sub>2</sub>
Crystal Symmetry and Class	tetragonal, -42m
Lattice Parameters	$a = 5.467 \text{ \AA}$ $c = 12.736 \text{ \AA}$
Density	$4.162 \text{ g/cm}^3$
Mohs Hardness	5.5
Optical Class	Positive uniaxial
Useful Transmission Range	$2.0 \mu\text{m} - 10.0 \mu\text{m}$
Thermal Conductivity @ T= 293 K	$35 \text{ W/m}\cdot\text{K} (\perp c)$ $36 \text{ W/m}\cdot\text{K} (// c)$
Thermal Expansion @ T = 293 K to 573 K	$17.5 \times 10^6 \text{ K}^{-1} (\perp c)$ $15.9 \times 10^6 \text{ K}^{-1} (// c)$

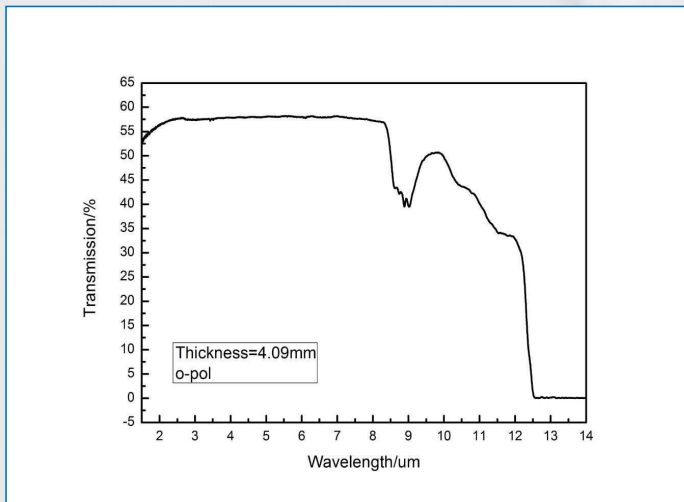
### ZGP Crystal Absorption coefficient

Uncoated

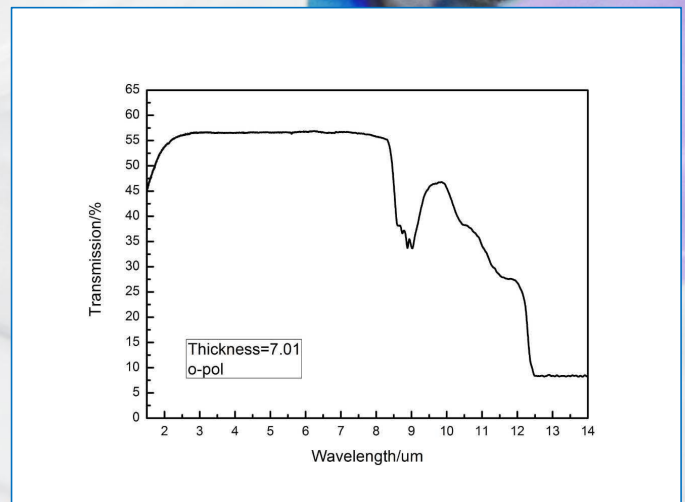


### ZGP Transmission curve

Test Thickness=4.09mm:



Test Thickness=7.01mm:



### Technical Parameters

Surface flatness	$PV < \lambda/4 @ 632.8nm$
Surface quality S-D	20-10
Wedge/Parallelism error	$< 30$ arc sec
Perpendicularity	$< 5$ arc min
Transparency range	0.75 - 12.0
Non-linear coefficient	$d_{36} = 68.9$ (at 10.6 um), $d_{36} = 75.0$ (at 9.6 um)