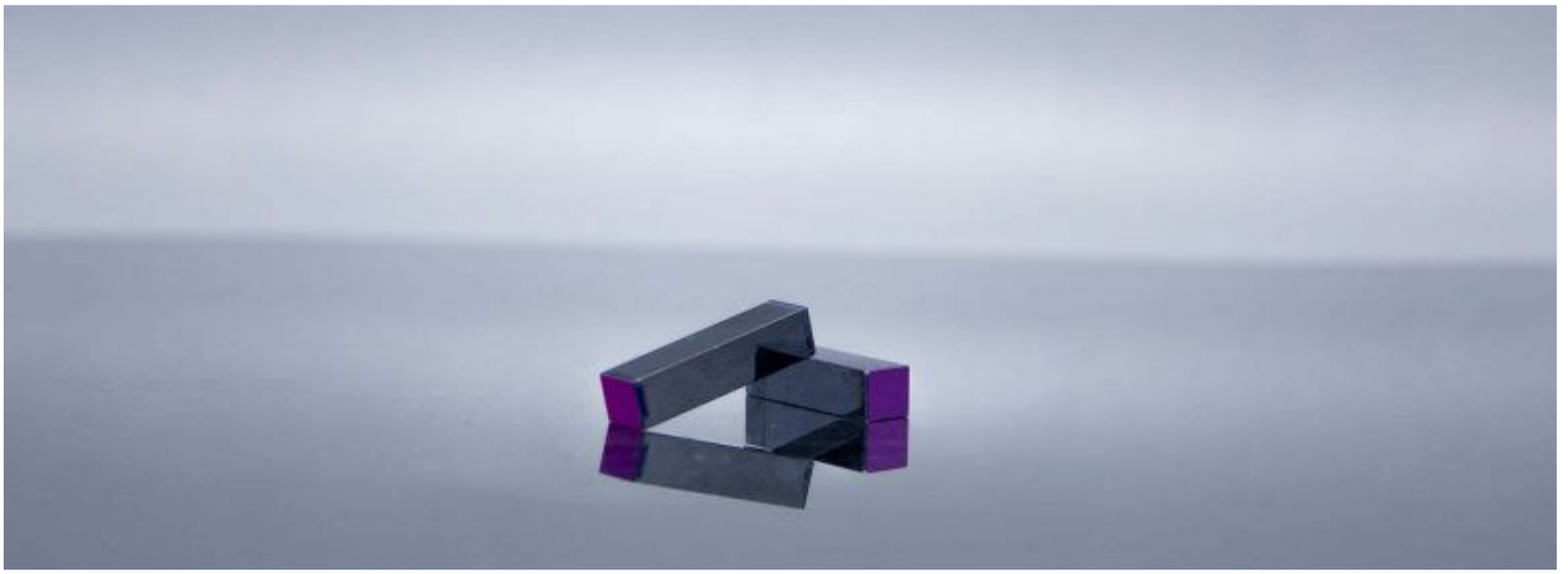
ZGP



DESCRIPTION

ZnGeP2（Zinc germanium phosphide）crystal has many good properties and is an mid-IR nonlinear crystal. The nonlinear susceptibility of ZnGeP2 (ZGP) crystal is approximately 160 times large (d36~75 pm/V) as KDP,.ZGP shows good optical transparency over the 0.74–12 mm and relatively high laser damage threshold, and is therefore well suited for producing near infrared tunable laser. ZGP is a very hopeful material for mid-infrared devices such as SHG, SFG, OPO, and OPG/OPA.

FEATURES

- Nonlinear coefficient is large
- The region of transmission is from 0.74 um to 12um
- High relative damage threshold
- High thermal conductivity
- The region of transparency is wide
- Phase matching over a broad spectral region

APPLICATIONS

- Producing coherent radiation in sub-millimeter-range from 70.0 μm to 1000 μm – terahertz range
- Combining frequencies of CO2– and CO-lasers radiation or other lasers that working in the transparency region of ZGP
- SHG of CO-laser
- Second, third, and fourth harmonic generation of CO2 laser
- OPO(Optical parametric generation) with pumping at wavelengths of 2.05-2.94 μm and possibility to generate effectively 3-10 μm ranges

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PARAMETER

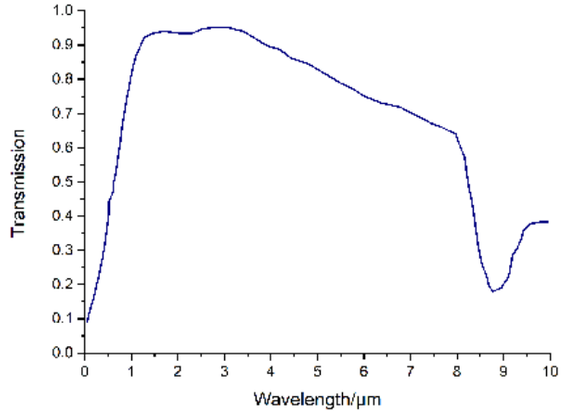
Chemical and Physical properties

Property	Value
Chemical Formula	ZnGeP2
Crystal Structure	Tetragonal,`42m
Lattice Parameter	a=b=5.467Å, c=12.736Å
Mass Density	4.16 g/cm3
Moh Hardness	5.5
Melting Point	About 1040°C
Thermal Conductivity	180 W/m/K
Thermal Expansion Coefficient	β||,5×10-6/K; β⊥,7.8×10-6/K
Birefringence	positive uniaxial

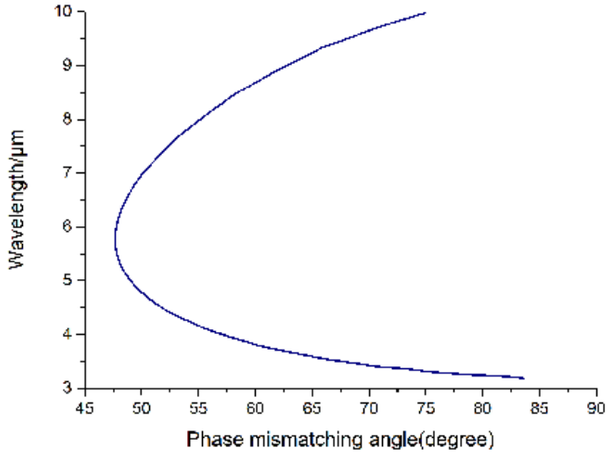
Nonlinear Optical Properties

Property	Value
SHG Phase Matchable Range	3177　10357nm (Type I)
NLO coefficients	d36=75 ± 8 pm/V
	Type Ⅰ deeo=d36 sin2θcos2φ
	Type Ⅱ doeo=deoo=d36 sinθsin2φ
Damage Threshold	
at 2.79 um	30 GW/cm2 (150 ps)
at 10.6 um	1 GW/cm2 (2 ns)

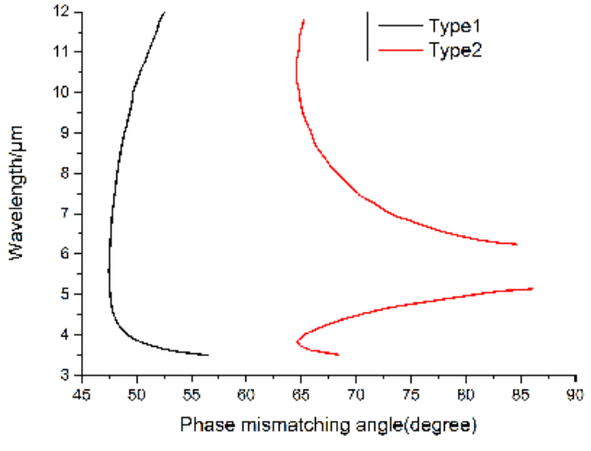
SPECTRA



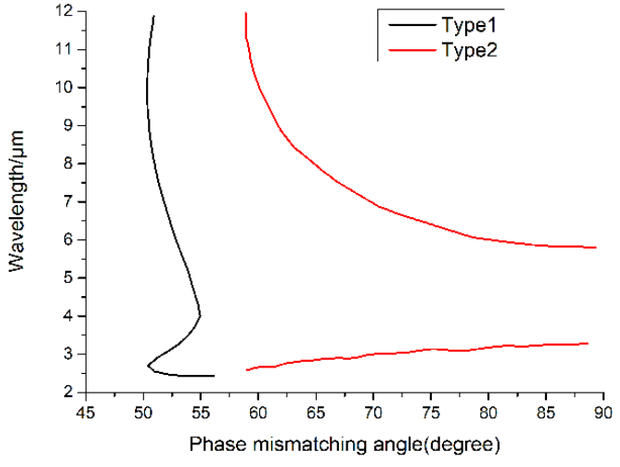
ZGP Transmission Spectrum



SHG curves of ZGP (TypeI (eeo))



OPO tuning curves of ZGP with pump light of 2800 nm



OPO tuning curves of ZGP with pump light of 2090 nm