$AgGaSe_2$

DESCRIPTION

$AgGaSe_2$ (Silver Gallium Selenide Crystal), referred to as AGSe crystal, is a group I-III-VI2 ternary compound semiconductor with chalcopyrite structure and 4-2 m point group. It is an excellent mid- and far-infrared nonlinear optical material, which can transmit infrared light from 0.73 to 21 μm, with a large nonlinear coefficient (d_{36}=43×10^{-12} m/V), suitable birefringence, phase matching for the second harmonic in the range of 3 to 18 μm, and is an effective crystal material for mid-infrared laser frequency doubling, and also has excellent properties of three-wave nonlinear interaction (OPO) It is an effective crystal material for mid-infrared laser multiplication and has excellent properties for three-wave nonlinear interaction (OPO). The available waveband is 0.9-16 μm. 2.5-12 μm OPO tuned light source is obtained by pumping $AgGaSe_2$ crystal with Ho:YLF 2.05 μm; 1.9-5.5 μm tuned light source is output by non-critical phase matching OPO pumped with 1.4-1.55 μm tuned light source.

FEATURES

- Large transmission range: from 0.73 to 18 μm
- Low optical absorption and low scattering
- Application wavelengths up to 17 μm in the mid-IR
- High FOM (quality factor) for nonlinear interactions in NIR and MIR
- High frequency doubling efficiency for mid-infrared lasers
- Tunable OPO for solid-state lasers with efficiencies up to 10% optical narrow-band filtering in the region around each homogeneity point

APPLICATIONS

- CO, CO_2 laser frequency doubling
- Frequency mixing in the mid-infrared region from 4.0 to 18.3 μm
- Non-linear frequency conversion of DFG, OPO, OPA, etc. in solid-state lasers

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MACHINING PARAMETERS

Orientation accuracy	<+-0.1°
Surface finish	30/20 per MIL-O-13830A
Face Type	λ/8@632.8nm for T>=1mm
Through surface tolerance	+0/-0.1mm
Length Tolerance	±0.1mm
Parallelism	30″
Perpendicularity	10′
reverse side	<0.2mm×45°

BASIC PERFORMANCE

Chemical formula	$AgGaSe_2$
Crystal Structure	Quadratic Crystal System
Lattice parameters	a=5.9920Å，c=10.8803Å
Optical symmetry	Negative uniaxial ($n_o>n_e$, λ<804 nm $n_e>n_o$)
Density	$5.7g/cm^3$
Mohs hardness	3-3.5
Transparency range	0.71-19μm
Sellmeier's equation @T=293 K(λinμm)	$n_o^2=6.8507+0.4297/(\lambda^2-0.1584)-0.00125\lambda^2$;
	$n_e^2=6.6792+0.4598/(\lambda^2-0.2122)-0.00126\lambda^2$
Refractive index @10.5 μ m	$n_o=2.5917$，$n_e=2.5585$
Thermal conductivity @t=293 K	1 (||c) $Wm^{-1}K^{-1}$, 1,1 (⊥c) $Wm^{-1}K^{-1}$
Laser damage threshold	>10MW/cm^2@10.6μm，150 ns
melting point	851℃
band gap	1.83eV
Frequency doubling coefficient	33pm/V
Birefringence	0.0246@1.06μm
	0.0317@5.3μm
	0.0332@10.6μm

SPECTRA