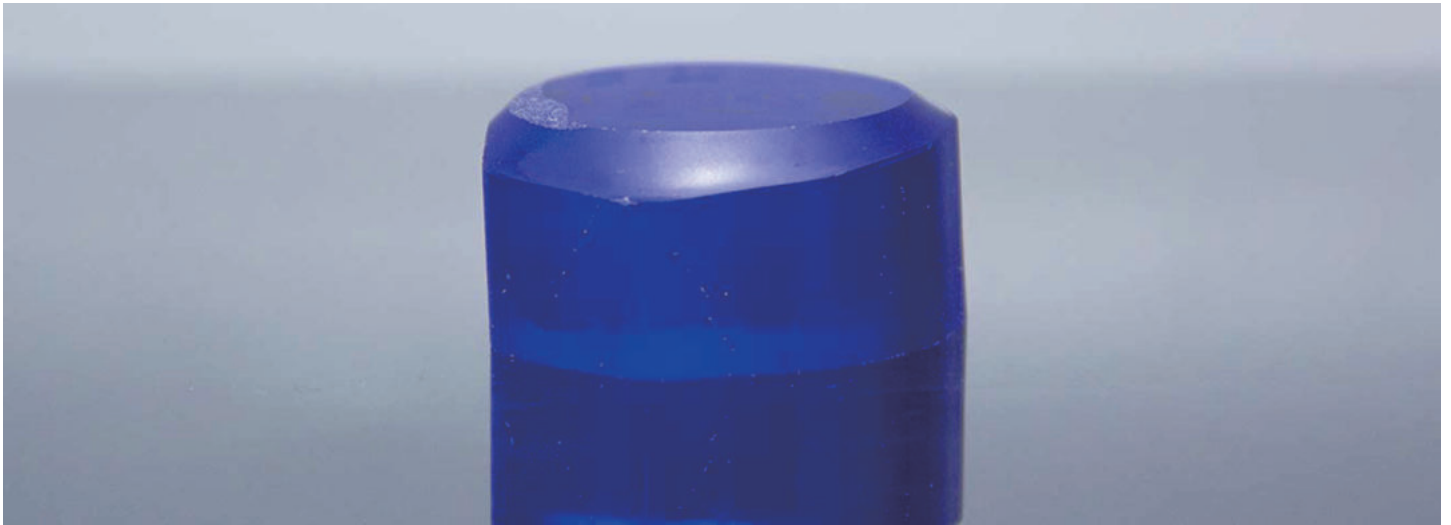


Co:spinel



DESCRIPTION

Co:spinel crystal, also known as cobalt spinel, with the chemical formula of $\text{Co}^{2+}:\text{MgAl}_2\text{O}_4$, is a relatively excellent Q-switched crystal product.

Cobalt spinel is a saturable absorber that can be used for passive Q-switching of solid-state lasers in human eyes at a safe wavelength of $1.5\ \mu\text{m}$. Cobalt doped magnesium aluminate spinel ($\text{Co}^{2+}:\text{MgAl}_2\text{O}_4$) can produce short nanosecond pulses at eye safe wavelength of $1.5\ \mu\text{m}$. The peak power near m is very suitable for telemetry applications. The utility model has the advantages of high absorption section, long service life, uniform cobalt distribution, absorption bandwidth, etc.

The absorption spectrum of Co^{2+} doped MgAl_2O_4 shows a wide absorption band in the wavelength range of 1200-1600nm, indicating that Co^{2+} ions replace tetrahedrally coordinated Mg^{2+} ions in MgAl_2O_4 lattice. Passive Q-switching of solid-state lasers with solid-state saturable absorbers is a very attractive Q-switching technology, because it allows the development of compact and low-cost nano and sub nanosecond pulsed laser sources. In industrial applications, due to $1.5\ \mu\text{m}$ laser radiation has high eye safety, so this wavelength has been widely concerned. Other advantages of this wavelength are the high transparency of atmospheric and fused silica waveguides and the availability of sensitive room temperature photodetectors (Ge and InGaAs photodiodes). This makes $1.5\ \mu\text{m}$ laser is very suitable for rangefinder, environmental sensing, telecommunications, surgery and so on. The absorption peak of Co:spinel is close to 1520nm, which is most commonly used for eye safety laser.

FEATURES

- Stimulate the long life
- High absorption section
- Q switch high constant
- Wide absorption band
- Uniform distribution of cobalt
- Rare stimulates the absorption

APPLICATIONS

- Subminiature pulsed diode pumped laser
- The range of 1535 nm (100 uJ) pulse laser
- Radar and laser rangefinder with 1535 nm (1 KHZ) pulse laser



Co:spinel

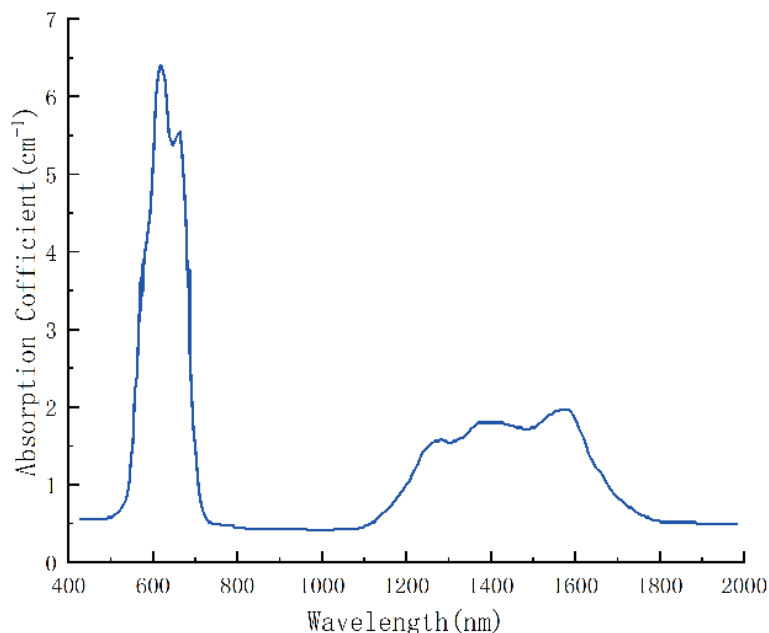
PHYSICAL AND CHEMICAL PROPERTIES

Chemical formula	$\text{Co}^{2+}:\text{MgAl}_2\text{O}_4$
The crystal structure	Cubic
The lattice parameters	8.07
The density	3.62 g/cm^3
Melting point	2105°C
The refractive index	$n=1.6948 @ 1.54\mu\text{m}$
Coefficient of thermal conductivity/ ($\text{Wcm}^{-1}\cdot\text{K}^{-1} @ 25^\circ\text{C}$)	0.033W
Thermal expansion coefficient/ ($10^{-6} /^\circ\text{C} @ 25^\circ\text{C}$)	1.046
Specific heat capacity/ ($\text{J}\cdot\text{g}^{-1}\cdot\text{K}^{-1}$)	5.9
Hardness (mo)	8.2
Extinction ratio	25dB
Orientation	[100] or [111] $< \pm 0.5^\circ$
Optical density	0.1-0.9
Damage threshold	$>500 \text{ MW/cm}^2$

MATERIAL SPECIFICATIONS

The concentration	(0.05~0.35) wt%
Absorption coefficient	$0 \sim 7 \text{ cm}^{-1}$
The ground state absorption cross section GSA ($\text{E}^{-19} \text{ cm}^2$)	$2.8 (\pm 0.4) @ 1340\text{nm}$
Excited state absorption cross section of ESA ($\text{E}^{-19} \text{ cm}^2$)	$2.0 (\pm 0.6) @ 1340\text{nm}$
The ground state absorption cross section GSA ($\text{E}^{-20} \text{ cm}^2$)	$3.5 (\pm 0.4) @ 1540\text{nm}$
Excited state absorption cross section of ESA ($\text{E}^{-20} \text{ cm}^2$)	$1.0 (\pm 0.6) @ 1540\text{nm}$
Working wavelength	1200– 1600 nm
The final configuration	Flat/Flat
Figure of merit (FOM)	100~300
Coating	AR/AR@1540, $R<0.2\%$; AR/AR@1340, $R<0.2\%$

SPECTRA



Co:spinel

SPECTRA

