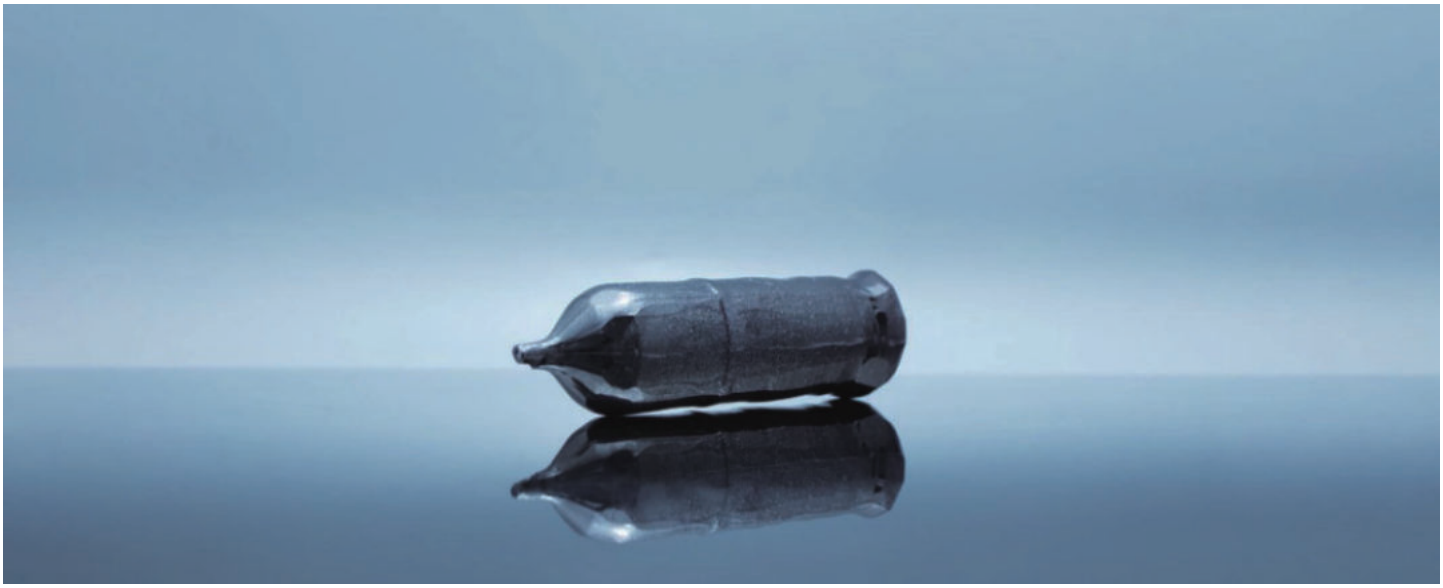
Cr:YAG



DESCRIPTION

Cr:YAG crystal, also known as chromium doped yttrium aluminum garnet crystal, with the chemical formula of Cr:$Y_3Al_5O_{12}$, is a relatively excellent Q-switched crystal product. It can be used not only as a Q-switch, but also as a gain medium because of its excellent physical and chemical properties.

It is widely used in the field of passive Q-switched lasers of laser rangefinders, lidar and LIBS systems. Cr:YAG has the advantages of chemical stability, durability, UV resistance, good thermal conductivity, high damage threshold (>500 mw/cm^2) and simple operation. It is surpassing traditional materials such as LIF and organic dyes.

Cr:YAG is an excellent and widely used electro-optical material for passive Q-switched (laser diode or lamp pumped) Nd:YAG, Nd:YLF, Nd:YVO_4 and other 0.8~1.2 μm Nd (or Yb) doped lasers. It is also an active medium for CW, pulse or self-mode-locked tunable NIR solid-state lasers. The tunable range is 1340 - 1580 nm and the working wavelength is 950-1100 nm.

The absorption saturation at 1060 nm band can be used in small Nd:YAG oscillators with flash lamp or laser diode pump, instead of dye or lif:f central passive Q-switch, so that Cr^{4+}:YAG crystal can achieve self mode locking (KML) state. It provides an opportunity to build a laser source with a pulse duration shorter than 100 fs at 1450-1580 nm.

FEATURES

- Radiation stability
- High thermal conductivity
- High damage threshold (> 500 MW/cm^2)
- Excellent physical and chemical properties

APPLICATIONS

- 266nm laser
- 1064nm laser
- 671nm laser(medical)
- 3D scanning
- The laser radar system
- Passive q-switched Nd:YAG laser

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Cr:YAG

MATERIAL SPECIFICATIONS

Chemical formula	$Cr^{4+}:Y_3Al_5O_{12}$
The crystal structure	Cubic - Ia3d
The lattice parameter Å	12.01
Orientation	[100] or [110] < ±0.5°
Mass density	4.56 g/cm^3
Mohs hardness	8.5
Young's modulus	335 GPa
Tensile strength	2 GPa
Melting point	1970°C
Coefficient of thermal conductivity	0.1213
Specific heat /（$J \cdot g^{-1} \cdot K^{-1}$）	0.59
Thermal expansion /（10^{-6} /°C @ 25°C）	7.8 <111>
	7.7 <110>
	8.2 <100>
Thermal shock parameters	800 W/m
Extinction ratio	25dB
Poisson's ratio	0.25
The refractive index @ 1064 nm	1.83
Charge compensation ion	Ca^{2+}, Mg^{2+}

OPTICAL PROPERTIES

Optical density	0.1 to 0.8
The fluorescence lifetime	3.4μs
The concentration	0.5 mol % ~ 3 mol %
Emission wavelength	1350 nm ~ 1600 nm
Absorption coefficient	1.0 cm^{-1}～ 7 cm^{-1}
The ground state absorption cross section	4.3×10-18 cm^2
Launching state absorption cross section	8.2×10-19 cm^2
Transmission	10% to 90%
Coating	AR≤ 0.2% @1064nm
Damage threshold	> 500 MW / cm^2

POLISHING SPECIFICATION

The direction of the tolerance	< 0.5°
The thickness/diameter tolerance	±0.05 mm
The surface roughness	<λ/8@632 nm
Wavefront aberration	<λ/4@632 nm
The surface quality	10/5
Parallel	10″
Vertical	5'
Clear aperture	>90%
Chamfering	<0.1×45°
HR coating	≤ 0.2% (@ 1340nm)
The largest size	2*2-15*15 mm×20mm

Cr:YAG

SPECTRA