Laser Crystal
Er:YAG

Er YAG, Erbium-doped Yttrium Aluminum Garnet (Er: $Y_3Al_5O_{12}$ or Er:YAG), combine various output wavelengths with Er:YAG's superior thermal and optical properties. It is an excellent laser crystal that lasers at 2.94 μm. This wavelength is the most readily absorbed into water and hydroxylapatite of all existing wavelengths and is considered a highly surface cutting laser. It is a well-known material for medical applications.

Er YAG laser Crystal—50% Erbium-doped in YAG, which can stimulate 2940nm laser used in medical anddentistry.

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Key Features

- Large electro-optic coefficient
- Not easy to deliquesce
- High sensitive
- Wide transparency range
- High optical damage threshold
- Stable chemical and physical properties

Applications

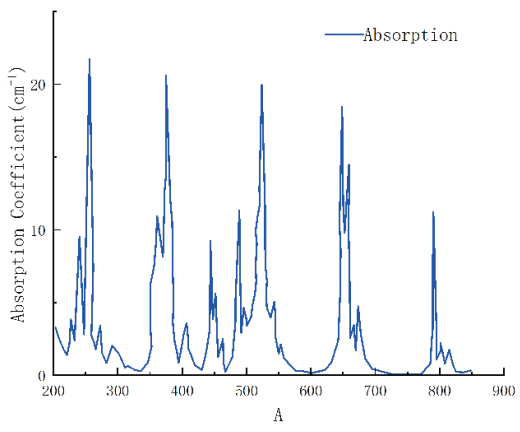
Optical Communication

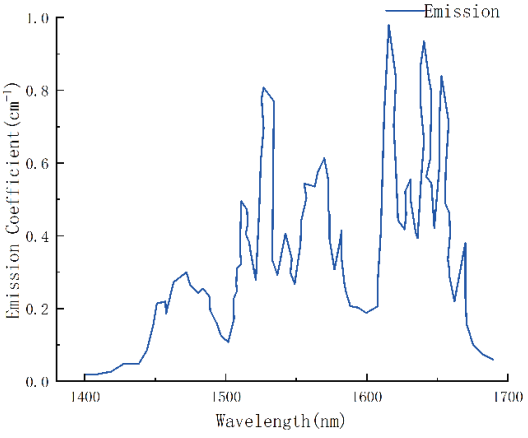
1600nm laser

Medical Applications

2940nm laser

Spectra





Technical Specifications

Material Specifications	
Direction	[100] or [100] <± 0.5°
Parallelism	10″
Vertical Degree	5′
Surface Quality	5-Oct
Wavefront Distortion	< λ/8@632 nm
Surface Flatness	<λ/10@632.8nm
Clear Aperture	>90%
Chamfering	0.1mm@45°
Thickness/Diameter Tolerance	±0.05 mm
The Largest Size	Diameter:2mm-50mm, Length:5mm-180mm
Coating	< 0.25% @ 2940 nm

Physical and Chemical Properties	
Chemical Formula	Er:$YAlO_3$
Crystal Structure	Rhombic Crystals-Pbnm
Molecular Mass	163.884
Shape	Translucent Crystalline Solid
Direction	b Shaft-Pbnm
Melting Point	1870 °C
Density	5.35 g/cm^3
Specific Heat Capacity	0.557 J/g·K
Coefficient of Thermal Conductivity	11.7 W/m·K (a-axis), 10.0 W/m·K (b-axis), 13.3 W/m·K (c-axis)
Coefficient of Thermal Expansion	2.32 x 10^{-6} K^{-1} (a-axis), 8.08 x 10^{-6} K^{-1} (b-axis), 8.7 x 10^{-6} K^{-1} (c-axis)
Precise Quality	163.872 g/mol
Single Isotope Mass	163.872 g/mol

Optical and Spectral Properties	
Laser Transition	$^4I_{11/2} \rightarrow {}^4I_{13/2}$ (High Doping), $^4I_{13/2} \rightarrow {}^4I_{15/2}$ (Low Doping)
Laser Wavelength	2940 nm (High Doping); 1645 nm (Low Doping)
Photon Energy	6.75×10^{-20}J@2940nm
Pump Absorption Bandwidth	600~800 nm (High Doping); 1530 nm (Low Doping)
Damage Threshold	>500MW/cm^2
Emission Cross Section	3×10^{-20} cm^2
Fluorescence Lifetime	0.23 ms (High Doping); 2~5 ms (Low Doping)
Refractive Index	1.7838@2940 nm