

# Er:YAG

## Introduction

**Er:YAG** is an excellent laser crystal which lases at 2940 nm. This wavelength is the most readily absorbed into water and hydroxylapatite of all existing wavelengths and is considered a highly surface cutting laser. It has wide applications in medical applications, such as dental (hard tissues), orthopedics, etc.

## Advantages of Er:YAG Crystal

- High slope efficiency
- Operate well at room temperature
- Operate in a relatively eye-safe wavelength range

### Material and Specifications

Dopant Concentration	Er: ~50 at%
Wavefront Distortion	$\leq 0.125\lambda/\text{inch}(@1064\text{nm})$
Extinction Ratio	$\geq 25$ dB
Rod Sizes	Diameter: 3~6mm, Length: 50~120 mm Upon request of customer
Dimensional Tolerances	Diameter: $+0.000"/-0.002"$ , Length: $\pm 0.02"$
Barrel Finish	Ground Finish: 400# Grit
Parallelism	$\leq 10"$
Perpendicularity	$\leq 5'$
Flatness	$\lambda/10$
Surface Quality	10-5(MIL-PRF-13830B)
Chamfer	$0.006" \pm 0.002"$ at $45^\circ \pm 5^\circ$
AR Coating Reflectivity	$\leq 0.25\%$ (@2940nm)

### Optical and Spectral Properties of Er:YAG Crystal

Laser Transition	$^4I_{11/2}$ to $^4I_{13/2}$
Laser Wavelength	2940nm
Photon Energy	$6.75 \times 10^{-20}\text{J}(@2940\text{nm})$
Emission Cross Section	$3 \times 10^{-20} \text{cm}^2$
Index of Refraction	1.79 @2940nm
Pump Bands	600~800 nm