



性能
合作
价值

高增益/低门槛

高效率

1.06 μm 低损耗

高光学质量

良好的机械性
和热性能

Nd:YAG Rods

Laser Crystal



Standard Rod Specifications

Material Parameters

Host: Yttrium Aluminum Garnet ($Y_3Al_5O_{12}$)
 Standard Melt Concentrations:
 Nd: 0.6 ± 0.1 at %
 0.8 ± 0.1 at %
 1.1 ± 0.1 at %
 1.3 ± 0.1 at %

Wavefront Distortion: $\lambda/4$ wave per inch of rod length ($\lambda=632.8\text{nm}$) standard and $\lambda/16$ per inch of rod length (premium grade)

Dimensional Tolerances

Diameter: +0.000" / -0.002"
 Length: +0.040" / -0.000"
 Barrel Finish: 55±5μinch (RMS)
 Chamfer: 0.005"±0.0003" at 45°±5°

End Configuration

Flatness: less than $\lambda / 10$ wave (measured at 632.8 nm)
 Parallelism: less than 10 seconds of arc
 Perpendicularity: less than 5 minutes of arc
 Scratch-Dig: 10 - 5 per MIL-O-13830A

Anti-Reflection Coatings

Reflectivity: less than 0.25% at 2080nm
 Adhesion and Durability: meets MIL-C-48497A standards
 Pulsed Damage Threshold: greater than 10 J/cm²

Properties of Nd:YAG

Lasing Properties

Lasing Transition: $^4F_{3/2} - ^4I_{11/2}$
 Lasing Wavelength: 1064 nm
 Fluorescence Lifetime: 230μs

Special Properties

Index of Refraction: 1.8245 (at 0.8μm)
 1.8222 (at 0.9μm)
 1.8197 (at 1.0μm)
 1.8152 (at 1.2μm)
 1.8121 (at 1.4μm)

Formula: $Y_{2.97}Nd_{0.03}Al_{5.12}O_{12}$
 Weight % Nd: 0.725
 Nd Atoms / cm³: 1.38 x 10²⁰
 Thermal Conductivity: 0.14 W cm⁻¹ K⁻¹
 Specific Heat: 0.59 Jg⁻¹ K⁻¹
 Thermal Expansion: 6.9 x 10⁻⁶°C⁻¹
 dn/dt: 7.3 x 10⁻⁶°C⁻¹
 Young's Modulus: 3.17 x 10⁴Kg/mm²
 Poisson Ratio: 0.25
 Thermal Shock Resistance: 790 Wm⁻¹

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