

Ruby Rods (694 nm)

- Robust solid-state laser materials with a thermal shock resistance three times that of Nd:YAG.
- Two broad absorption bands appropriate for pumping by flashlamp
- Rod Lengths: 3 mm – 152.4 mm
- Rod Diameters: 2 mm – 12.7 mm



General Specifications	
Diameter Tolerance:	+0.000" / -0.002"
Chamfer:	0.005" ± 0.003" @ 45°
Barrel Finish:	30 ± 5 μinches
Perpendicularity:	within 5 arc minutes
Parallelism:	30 arc-seconds or less
Rod End Face Flatness:	within λ / 10 wave at 632 nm wavelength
Surface Quality:	10 - 5 scratch-dig per MIL-O-13830 A
Wave Front Distortion:	less than 1/2 wave per inch of length (measured at 1 micron)
Standard Coating:	Anti-Reflection where R < 0.25% @ 694 nm
Laser rod orientation:	60 ± 5° from the c-axis

Optical Properties	
Chrome Concentration Standards:	0.03±0.005 wt% Cr ₂ O ₃ 0.05±0.005 wt% Cr ₂ O ₃
Chrome Ion Density (0.03 wt %):	0.948 x 10 ¹⁹ cm ⁻³
Refractive Indices at 694.3 nm: (Negative, Uniaxial)	Ordinary, E _⊥ c = 1.763 Extraordinary, E c = 1.755
Refractive Index Temperature Coefficient: 633nm	13 x 10 ⁻⁶ K ⁻¹
Brewster angle at 694.3nm	60.62°
Fluorescence lifetime at 300K:	3.0 ms

Structural & Thermal Properties	
Formula:	Cr ³⁺ : Al ₂ O ₃
Crystal System:	Trigonal
Unit Cell Dimensions (as if hexagonal)	a = 4.785 Å c = 12.99 Å
X-Ray Density:	3.98 g/cm ³
Melting Point:	2040°C
Thermal Expansion: at 323 K	⊥ c 5 x 10 ⁻⁶ K ⁻¹ c 6.7 x 10 ⁻⁶ K ⁻¹
Thermal Conductivity: 300K	28 W / m·K
Hardness:	Mohs: 9, Knoop: 2000 kg mm ⁻²
Young's Modulus:	345 GPa
Specific Heat: at 291K	761 J kg ⁻¹ K ⁻¹
Thermal Stress Resistance parameter, R_T:	34 W / cm

Ruby 0.03%Cr Unpolarized

(Uncorrected for Fresnel loss)

