

Nd-doped Potassium Gadolinium Tungstate Single Crystals

Nd:KGW crystals are low lasing threshold, highly efficient laser material exceptionally suitable for laser rangefinding applications.

The efficiency of Nd:KGW lasers is 3–5 times higher than the one of Nd:YAG lasers. Nd:KGW laser medium is one of the best choices ensuring effective laser generation at low pump energies (0.5 – 1 J). These crystals supplied by EKSMA Co. feature high optical quality and great value of bulk strength for laser radiation.

Existing technology allows to obtain single crystals of mass up to 3 kg. This ensures reliable and high yield fabrication of round elements of diameter up to 12 mm and length up to 120 mm.

MATERIAL PHYSICAL AND LASER PROPERTIES

Chemical formula	KGd(WO ₄):Nd
Lattice constants	a = 8.095 Å, b = 10 Å, c = 7.588 Å
Optical orientation	n _g = b, n _p c = 20 deg
Angle between optical axis	86.5 angular grad
Density	7.27 g/cm ³
Mohs hardness	5
Thermal conductivity	2.8 W/(m×grad) [100] 2.2 W/(m×grad) [010] 3.5 W/(m×grad) [001]
Thermal expansion	4×10 ⁻⁶ grad ⁻¹ [100] 3.6×10 ⁻⁶ grad ⁻¹ [010] 8.5×10 ⁻⁶ grad ⁻¹ [001]
Phase transition	1005 °C
Melting point	1075 °C
Transmission range	0.35-5.5 μm
Refractive index	n _g = 2.033 @ 1.067 μm n _p = 1.937 @ 1.067 μm n _m = 1.986 @ 1.067 μm
Transition	⁴ F _{3/2} → ⁴ I _{11/2}
Laser wavelength	1.0672 μm
Fluorescence lifetime	120 ms
Fluorescent width	24 cm ⁻¹
Emission cross-section	4.3×10 ⁻¹⁹ cm ⁻²
Emission temperature drift	8.5×10 ⁻⁴ nm, K ⁻¹

STANDARD PRODUCT SPECIFICATIONS

Orientation	[010] ±30 min
Dopant concentration	2-10 at %
Diameter tolerance	+0.0/-0.1 mm
Length tolerance	+1.0/-0.0 mm
Chamfer	45(±10) deg × 0.2(±0.1) mm
Flatness	λ/10 @ 633 nm
Parallelism	better than 30 arcsec
Perpendicularity	better than 15 arcmin
Surface finishing	10/5 scratch/dig
Absorption losses	< 0.005 cm ⁻¹

Please contact EKSMA for further information or detailed quotation.