

## A NEW EFFICIENT LASER MEDIUM:

**$Nd^{3+}:KGd(WO_4)_2$  NEODYMIUM-DOPED  
POTASSIUM-GADOLINIUM TUNGSTATE (Nd:KGW)**

**LASING AT 1.067  $\mu$ m**

**WITH REMARKABLE FEATURES:**



- ✓ **300% more output** compared to Nd:YAG, OR, for the same output energy of Nd:YAG **three times lower pump power** AND more than **10 times longer** flashlamp lifetime!
- ✓ **Nd:KGW is an efficient Raman converter** which produces high intensity radiation shifted to 1.18  $\mu$ m and 1.54  $\mu$ m (Raman shift 905  $cm^{-1}$ ) suitable for fiber-optics communication and research.
- ✓ **SELF-PROTECTING FEATURE:** The efficient Raman conversion prevents self-focusing and self-phase modulation.
- ✓ **SUITABLE FOR THE GENERATION OF SUBPICOSECOND LIGHT PULSES:** The luminescence bandwidth (24  $cm^{-1}$ , 2.73 nm) is **six times broader** than that of Nd:YAG laser (0.45 nm) and **two times broader than that of Nd:YLF** thus allowing the generation of subpicosecond pulses. An ideal replacement for the expensive Nd:YLF!
- ✓ **HIGHER STORAGE DENSITY** due to the lower stimulated emission cross-section (compared to Nd:YAG) results in a better performance in Q-switched operation
- ✓ **WELL SUITED FOR DIODE-PUMPED LASERS!** Due to broad absorption band > 12 nm needs no thermal stabilization of the pump diode. Available with high doping of 8%. Differential efficiency >60%

**Attention:** the thermal conductivity of this crystal is lower than that of Nd:YAG! For flashlamp pumping an efficient cooling is needed.

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**Nd<sup>3+</sup>: KGd(WO<sub>4</sub>)<sub>2</sub>****Technical specifications****HOST CHARACTERISTICS:**

Chemical formula	KGd(WO <sub>4</sub> ) <sub>2</sub>
Space group	monoclinic; 2/m
Lattice constants [Å]	a=8.098; b=10.417; c=7.583; β=94.43 deg.
Density	7.27 g/cm <sup>3</sup>
Mohs hardness	5
Melting point	1075 ±5 °C
Thermal conductivity	2.8[100]; 2.2[010]; 3.5[001] W.m <sup>-1</sup> .K <sup>-1</sup>
Thermal expansion	4.0[100]; 3.5[010]; 8.5[001] 10 <sup>-6</sup> .K <sup>-1</sup>
Transmission range	350 ÷ 5500 nm
Refractive index [1 μm, 25°]	n <sup>g</sup> =2.033; n <sup>m</sup> =1.986; n <sup>p</sup> =1.937
Polymorphic transition	1005 ±5 °C

**LASING PROPERTIES:**

Principal lasing transition	<sup>4</sup> F <sub>3/2</sub> - <sup>4</sup> I <sub>11/2</sub>
Lasing wavelength	1067.2 nm
Fluorescent lifetime	110 μs (3% doping), 90 μs (8% doping)
Fluorescent width	24 cm <sup>-1</sup> ; 2.73 nm
Emission cross-section	4.3x10 <sup>-19</sup> cm <sup>2</sup>
Gain and absorption	anisotropic
Optimum LD-pump wavelength	811 nm
Absorption coefficient (8% conc.)	36 cm <sup>-1</sup>
Absorption LD-pump BW (8% conc.)	12 nm, centered at 811 nm
Efficiency, flashlamp-pumped	4%
Efficiency, LD-pump	>60% differential

**ROD SPECIFICATIONS:**

Orientation	[010] ±0.5°
Dopant concentration [at. %]	3% standard, up to 8% available
Standard rod sizes xL	6.3x60; 6.3x75 mm
Maximum length	75 mm
Standard chips for LD-pump	4x4x2 mm, 6x2 mm, 3x2 mm