

Yb:KGW crystals

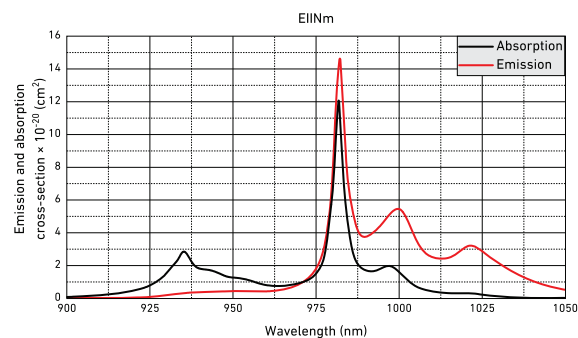
Main features

- Large gain bandwidth
- High emission cross-sections
- Small quantum defect
- High doping level
- High thermal conductivity
- Custom crystals available upon request

Application examples

- Femtosecond lasers and regenerative amplifiers
- CW and passively mode-locked thin-disk lasers

Yb³⁺:KGW crystals possess a large gain bandwidth that enables to obtain <100 fs pulse duration in mode-locked regime of operation. Compared with other ytterbium-doped gain media with a similarly large gain bandwidth, ytterbium-doped tungstate has fairly high emission cross-sections. Ytterbium doping concentration in Yb:KGW crystals can be up to 5 at. % without a significant quenching. Thermal conductivity of common double tungstates is in the range of 3–4 Wm⁻¹K⁻¹. Yb:KGW crystals exhibit a small quantum defect and it is possible to operate with a quantum defect well below ~4–5%.



Standard specifications

YB:KGW CRYSTALS	
Orientation	Ng-cut; Np(b)-cut and other orientation available
Clear aperture	>90%
Face dimensions tolerance	+0,0/-0,1 mm
Length tolerance	±0,1 mm
Parallelism error	<20 arcsec
Perpendicularity error	<10 arcmin
Protective chamfers	<0,1 mm at 45°
Surface quality	20-10 S-D
Surface flatness	<λ/10@632,8 nm
Coatings	AR(R<0,5%)@970-1070 nm
Laser induced damage threshold	>10 J/cm²@1040 nm, 10 ns
Mount	Unmounted

Properties

SPECTROSCOPIC AND THERMO-MECHANICAL PROPERTIES	
Absorption peak wavelength	980 nm
Absorption cross-section at peak wavelength	$12 \times 10^{-20} \text{ cm}^2$ (E N _g)
Absorption bandwidth at peak wavelength	3,7 nm
Laser wavelength	1025 (1020-1060) nm
Lifetime of ² F _{5/2} ytterbium energy level	240 μs
Emission cross-section at 1030 nm	$3 \times 10^{-20} \text{ cm}^2$ (E N _g)
Refractive index at 1064 nm	n _y = 2,037 n _p = 1,986 n _z = 2,033
Crystal structure	Monoclinic
Density	7,25 g/cm³
Mohs hardness	4-5
Thermal conductivity	K _x = 2,6 Wm ⁻¹ K ⁻¹ K _y = 3,8 Wm ⁻¹ K ⁻¹ K _z = 3,4 Wm ⁻¹ K ⁻¹
dn/dT	dn _y /dT = -15,7×10 ⁻⁶ K ⁻¹ dn _p /dT = -11,8×10 ⁻⁶ K ⁻¹ dn _z /dT = -17,3×10 ⁻⁶ K ⁻¹
Thermal expansion coefficient	α _y = 1,7 × 10 ⁻⁵ K ⁻¹ α _p = 11,01 × 10 ⁻⁵ K ⁻¹ α _z = 17,37 × 10 ⁻⁵ K ⁻¹
Typical doping level	1-5 at. %

Standard products

FACE DIMENSIONS	LENGTH	END FACES	DOPING	COATINGS	SKU
3 x 3 mm	10 mm	Brewster-angle cut	1%	Uncoated	7051
	10 mm	Right-angle cut	1%	AR/AR@970-1070 nm	7049
5 x 5 mm	10 mm	Brewster-angle cut	1%	Uncoated	7052
	10 mm	Right-angle cut	1%	AR/AR@970-1070 nm	7050
3 x 3 mm	5 mm	Brewster-angle cut	2%	Uncoated	7055
	5 mm	Right-angle cut	2%	AR/AR@970-1070 nm	7053
5 x 5 mm	5 mm	Brewster-angle cut	2%	Uncoated	7056
	5 mm	Right-angle cut	2%	AR/AR@970-1070 nm	7054
3 x 3 mm	3 mm	Brewster-angle cut	3%	Uncoated	7059
	3 mm	Right-angle cut	3%	AR/AR@970-1070 nm	7057
5 x 5 mm	3 mm	Brewster-angle cut	3%	Uncoated	7060
	3 mm	Right angle cut	3%	AR/AR@970-1070 nm	7058
3 x 3 mm	2 mm	Brewster-angle cut	5%	Uncoated	7063
	2 mm	Right-angle cut	5%	AR/AR@970-1070 nm	7061
5 x 5 mm	2 mm	Brewster-angle cut	5%	Uncoated	7064
	2 mm	Right-angle cut	5%	AR/AR@970-1070 nm	7062


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