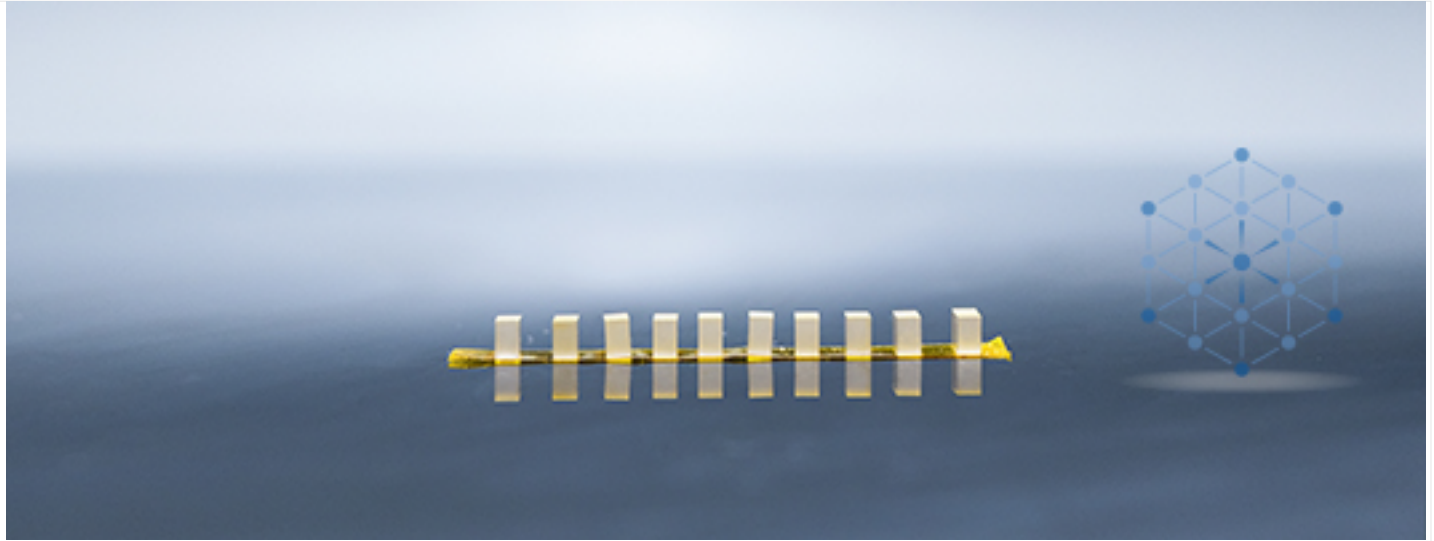


Er,Yb:Glass



DESCRIPTION

Er³⁺/Yb³⁺ co-doped phosphate glass — as the 1540nm eye-safe radiation sources pumped by LD which can emit eye-safe 1540nm laser radiation directly used in laser ranging finder and telecommunication communication

Er³⁺ emission transition occurs within this wavelength range corresponding to the ${}^4I_{13/2} \rightarrow {}^4I_{15/2}$. However, Er³⁺ absorption itself is too weak to allow direct pumping and so, energy transfers are required. The most efficient ones are given by Yb³⁺ ions under absorption from the ${}^2F_{7/2} \rightarrow {}^2F_{5/2}$ transition, followed by energy transfer to the ${}^4I_{11/2}$ Er³⁺ level and fast nonradiative transition to the Er³⁺ ${}^4I_{13/2}$ level which emits the expected fluorescence. Er,Yb:glass laser with radiation output at the wavelength of 1540 nm does not require the addition of additional components.

As an eye-safe wavelength laser, 1540nm, Er³⁺/Yb³⁺ co-doped phosphate glass lasers have attracted much attention for their compactness and low cost, such as laser generation and signal amplification because the wavelength of 1540nm is just at the position of the eye-safe and the fiber optic communication window. 1540nm lasers have used in ranging finder, radar, target recognition. Er³⁺/Yb³⁺ co-doped phosphate glass cooperate with passive Q-Switch crystal -co:spinel to get 1540nm pulse solid-state laser.

WM4: Erbium phosphate glass for ion-exchange purpose.

EAT14: Yb³⁺, Er³⁺ co-doped phosphate glass, which is applicable in high repetition rate (1-6HZ) laser diode pumped 1535nm laser. High Yb³⁺ doping can be realized in this EAT14 glass.

FEATURES

- Wide absorption band
- Long fluorescence lifetime
- High optical quality
- Safety for eye
- High slope efficiency

APPLICATIONS

- 1535nm eye-safe laser
- Er glass fiber amplifier
- Range finder
- Target recognition



Er, Yb:Glass

PARAMETERS

LASER SPECIFICATIONS

Property	EAT14	WM4
Cross section for stimulated emission (10^{-20}cm^2)	0.8	0.75
Fluorescent lifetime (ms)	7.7-8.0	7.7-8.2
Center lasing wavelength (nm)	1535	1535

OPTICAL PROPERTIES

Property	EAT14	WM4
Refractive index (1535nm)	1.524	1.528
Refractive index (d 589.3nm)	1.532	1.536
Abbe value	66	66
d_n/d_T ($10^{-6}/\text{C}$) (20~100 C)	-1.72	-3

OTHER SPECIFICATIONS

Property	EAT14	WM4
Density (g/cm^3)	3.06	2.83
Chemical durability($\mu\text{g}/\text{hr}\cdot\text{cm}^2$) (weigh loss rate at 100 C distilled water)	1.532	1.536

THERMAL SPECIFICATIONS

Property	EAT14	WM4
Transformation temp. (C)	556	530
Softening temp. (C)	605	573
Coeff.of linear thermal expansion ($10^{-7}/\text{K}$)	87	82
Thermal Coeff.of optical path length ($10^{-6}/\text{K}$)	2.9	1.4
Thermal conductivity (25 C) (W/mK) Parallel	0.7	0.7

POLISHING SPECIFICATION

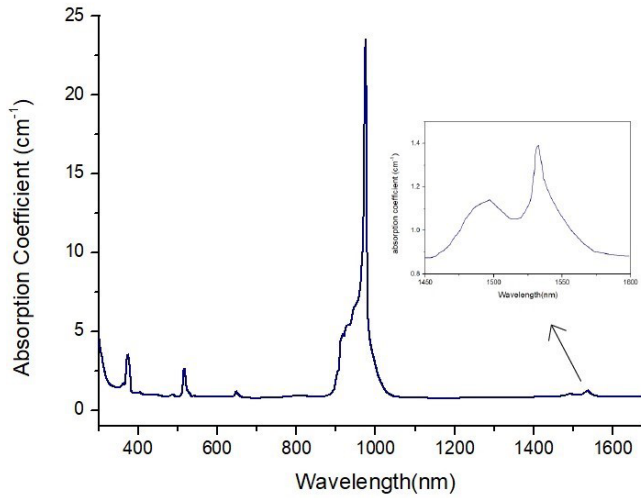
Property	Value
Orientation Tolerance	$< 0.5^\circ$
Thickness/Diameter Tolerance	$\pm 0.05 \text{ mm}$
Surface Flatness	$< \lambda/8 @ 632 \text{ nm}$
Wavefront Distortion	$< \lambda/4 @ 632 \text{ nm}$
Surface Quality	10-5
	$10''$
Perpendicular	$15'$
Clear Aperture	$> 90\%$
Chamfer	$< 0.1 \times 45^\circ$
Maximum dimensions	$\text{dia}(3-12.7) \times (3-150) \text{mm}^2$



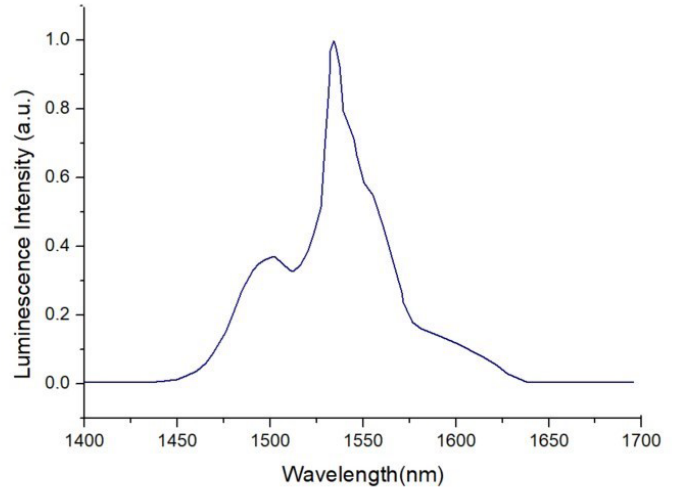
Er,Yb:Glass

SPECTRA

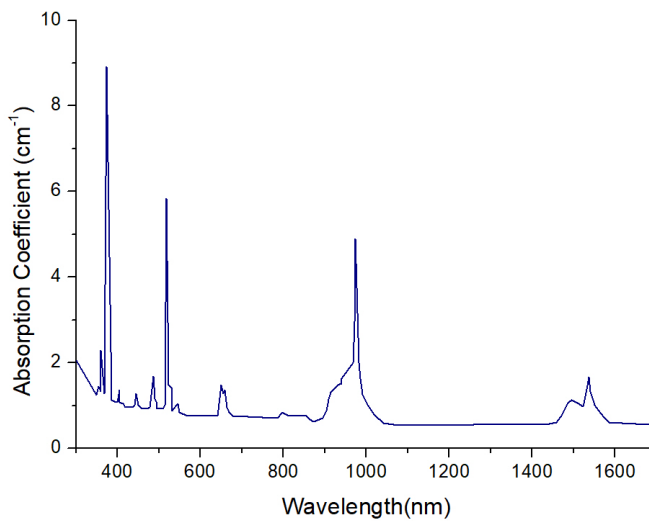
ETA14 Absorption



EAT14 Emission



WM4 Absorption



WM4 Emission

