IOG-2 Phosphate Laser Glass

For High Gain Applications

IOG-2 is a potassium-barium-alumino phosphate glass with high erbium and ytterbium cross sections for stimulated emission. Although not as chemically durable as IOG-1, IOG-2 is an excellent candidate for active photonic devices that require high gain.

Optical Properties	
n_d	1.518
v_d	66.8
$n_{1000\ nm}$ (calculated)	1.510
$n_{1540\ nm}$ (calculated)	1.508

Erbium Laser Properties	
Emission Maxima, λ (nm)	1533
Emission Cross Section at 1533 nm (10^{-21} cm²)	8.0
Excited State Lifetime for the 1533 nm Band (ms)	9.0
Max Absorption Cross Section for 980 nm Pump Band (10^{-21} cm²)	2.4

Ytterbium Laser Properties	
Emission Maxima, λ (nm)	1000
Emission Cross Section at 1000 nm (10^{-21} cm²)	5.4
Excited State Lifetime for the 1000 nm Band (ms)	1.5
Max Absorption Cross Section for 980 nm Pump Band (10^{-21} cm²)	14.1

• Properties will vary slightly with doping content

Chemical Properties	
Weight Loss in 50 °C Water [mg/(cm² x day)]	0.028
Acid Resistance SR pH = 0.3 at 25 °C	4.0
Alkali Resistance AR pH = 12 at 50 °C	4.0
Staining Resistance FR pH = 4.6 100 h at 25 °C	1
Climatic Resistance CR Water Vapor at 40–50 °C for 30 h	2

Physical Properties	
Density, ρ [g/cm³]	2.72
Thermal Conductivity (25°C), κ [W/m x K]	0.57
Young's Modulus, E [GPa]	54
Poisson's Ratio, ν	0.27
Fracture Toughness, K_{1c} [MPa x m$^{1/2}$]	0.47
Knoop Hardness, $HK_{0.1/20}$	340
Heat Capacity (25°C), C_p [J/g x K]	0.75
Thermal Diffusivity (25°C), σ [10^{-7} m²/sec]	2.92
Thermal Expansion, $\alpha_{20-300°C}$ [10^{-7}/K]	145
Thermal Expansion, $\alpha_{20-40°C}$ [10^{-7}/K]	125
Glass Transformation Temperature, T_g (°C)	375

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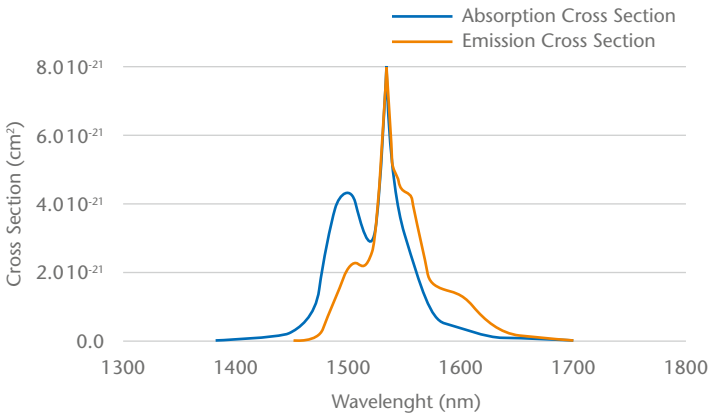
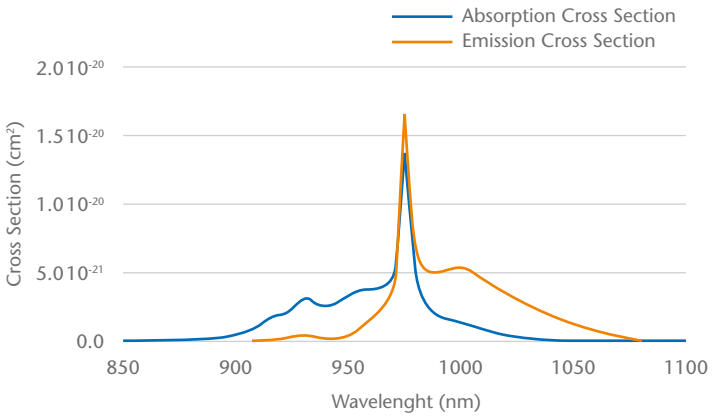
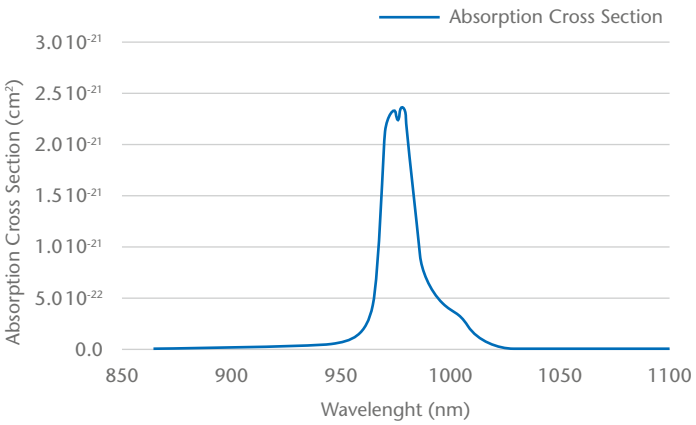
Erbium Absorption and Emission Cross Sections around 1540 nm



Ytterbium Absorption and Emission Cross Sections around 980 nm



Erbium Absorption Cross Section around 980 nm



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