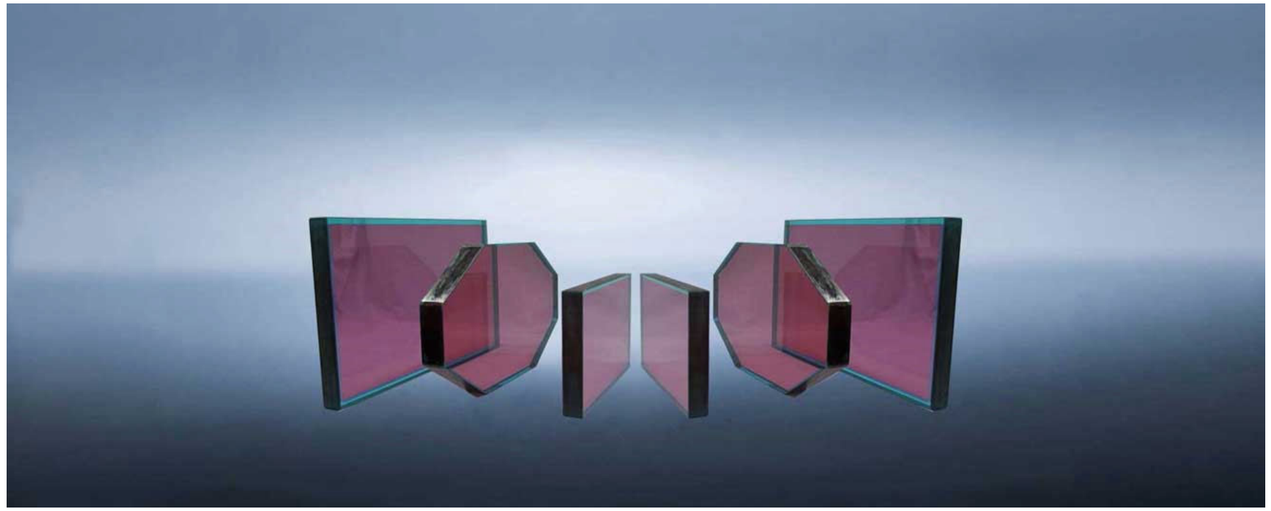
Nd Glass



OPTICAL SPECIFICATIONS

	N_{31}	N_{41}	N_{51}	NAP		NF		NSG_2
				NAP2	NAP4	NF1	NF2	
Nonlinear refractive index coefficient n^2 ($\times 10^{-13}$ e.s.u)	≤1.2	≤1.04	≤1.04	≤1.25	≤1.10	≤0.6	≤0.86	≤ 1 . 6
Refractive index (1053 nm)	1.535± 0.003	1.504± 0.003	1.505± 0.003	1.537± 0.003	1.515± 0.005	1.464± 0.003	1.514± 0.003	1.560± 0.003
Abbe value	65.6	68.2	68.2	67	67	88	77	59
dn / dt (10^{-6} /℃) (20∽100℃)	-4.3	\	-9	-9	1.9	-8.84	-8.6	2

N_{31} phosphate glass was developed specifically for high-power laser equipment.N31 is a material with high energy storage, large excitation cross section and long fluorescence lifetime properties. It is also easy to prepare large size and good optical uniformity of the glass, so it is widely used in high power laser systems. Currently, it has been successfully used in the Shenlight II and Shenlight III systems.

N_{41} Nd-doped phosphate glass has high excited emission cross section, low nonlinear refractive index and good thermal properties, which is especially suitable for high power laser equipment. N_{41} has a lower refractive index than N_{21} and N_{31}.

N_{51} Nd-doped phosphate glass has high energy storage, large excited emission cross section, long fluorescence lifetime, easy to prepare large size and good optical uniformity. Therefore, it is widely used as a working substance for amplifiers in high-power laser systems.

NAP-doped phosphate glasses are specially manufactured for high average power applications. NAP2 and NAP4 are two new laser glasses with high thermal shock resistance, which have high thermal conductivity, low thermal expansion coefficient and moderate emission cross section. They are used in laser systems with high repetition rates, high energy rates and high energies, and have a wide range of applications in OPCPA systems for laser range finders, laser blasting and pump lasers.

NF Nd-doped fluorophosphate glasses have low nonlinear coefficient, high fluorescence lifetime, easy mass preparation, excellent glass forming properties and good crystalline stability, which can meet the energy storage and amplification requirements of high-energy laser systems. Two kinds of NF glass.

NSG_2 neodymium-doped silicate glass is a laser glass with neodymium as the active ion and silicate glass as the substrate. It has a large excited emission cross section and a wide effective fluorescence line width. Moreover, it has good laser performance and gain performance. It can be widely used in the manufacture of lasers. This wider glass line and the availability of narrower ultrashort pulses make it the preferred choice for lasers with high energy and high peak power.

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LASER SPECIFICATIONS

	N_{31}	N_{41}	N_{51}	NAP		NF		NSG_2
				NAP2	NAP4	NF1	NF2	
wt%	3.5(Nd_2O_3)	4.6(Nd_2O_3)	4.0(Nd_2O_3)	\	\	0.88(NdF_3)	1.07(NdF_3)	\
Nd3+ conc. (10^{20}ions/cm^3)	3.4±0.1	4.3±0.1	3.9±0.1	\	\	0.2±0.1	1.2±0.1	\
Stimulated emission cross section ($10^{-20}cm^2$)	3.8±0.1	3.9±0.1	4.3±0.1	3.6±0.1	3.1±0.1	2.7±0.1	3.4±0.1	2.7±0.1
Lifetime of 1053nm (μsec)	≥370 (Nd_2O_3:0.5wt%)	≥370(Nd_2O_3: 0.5wt%)	≥375(Nd_2O_3: 0.5wt%)	≥360(Nd_2O_3: 0.5wt%)	≥370(Nd_2O_3: 0.5wt%)	≥515(NdF_3:0.53wt%)	≥430(NdF_3:0.53wt%)	≥380(Nd_2O_3:0.5wt%)
	≥360 (Nd_2O_3:1.2wt%)	≥360(Nd_2O_3: 1.2wt%)	≥365(Nd_2O_3: 1.2wt%)	≥350(Nd_2O_3: 1.0wt%)	≥360(Nd_2O_3: 1.0wt%)			≥360(Nd_2O_3:1.0wt%)
	≥315 (Nd_2O_3:3.5wt%)	≥315(Nd_2O_3: 3.5wt%)	≥320(Nd_2O_3: 3.5wt%)	≥330(Nd_2O_3: 2.0wt%)	≥330(Nd_2O_3: 2.0wt%)	≥495(NdF_3:1.07wt%)	≥410(NdF_3:1.07wt%)	≥330(Nd_2O_3:2.0wt%)
	≥310 (Nd_2O_3:4.2wt%)	≥310(Nd_2O_3: 4.6wt%)	≥315(Nd_2O_3: 4.2wt%)	≥310(Nd_2O_3: 3.0wt%)	≥310(Nd_2O_3: 3.0wt%)			≥270(Nd_2O_3:3.0wt%)
Effective bandwidth (nm)	25.4	25.5	24.5	25.4	28.5	32.8	30.4	34
Fluorescence peak wavelength (nm)	1053	1053	1053	1052	1052	1053	1053	1060
Absorption Coefficient (cm^{-1})	≤0.0015(1053nm)	≤0.0015(1053nm)	≤0.0015(1053nm)	≤0.0015(1053nm)	≤0.002(1053nm)	≤0.001(1053nm)	≤0.001(1053nm)	≤0.0015(1053nm)
	≤0.25(400nm)	≤0.25(400nm)	≤0.25(400nm)	≤0.25(400nm)	≤0.3(400nm)	≤0.04(400nm)	≤0.04(400nm)	
	≤1.5(3333nm)	≤1.5(3333nm)	≤1.5(3333nm)	≤1.5(3333nm)	≤1.5(3333nm)	≤0.08(3333nm)	≤0.08(3333nm)	

Nd Glass

THERMAL SPECIFICATIONS

	N_{31}	N_{41}	N_{51}	NAP		NF		NSG_2
				NAP2	NAP4	NF1	NF2	
transition temperature (℃)	445	467	408	500	545	450	490	485
Softening temperature (℃)	485	503	448	550	600	491	528	530
Coefficient of linear thermal expansion (10^{-7} / K) (30∽100℃)	116	129	141	87	63	152	142	95
Thermal coefficient optical path length (10^{-6} / K) (50∽100℃)	1.4	\	-1.9	3.8	5	-1.86	-1.2	7
heat conduction (25℃) (W / Mk)	0.59	\	\	0.76	0.88	0.865	\	1.2
Specific heat capacity (25℃) (J / Gk)	0.75	\	\	0.757	0.775	\	\	\

OTHER SPECIFICATIONS

	N_{31}	N_{41}	N_{51}	NAP		NF	
				NAP2	NAP4	NF1	NF2
Density g / cm^3	2.87	2.62	2.7	2.84	2.58	3.65	3.68
Young's modulus (Gpa)	58.3	52.4	45.2	58	67	73	76
Poisson's ratio	0.26	0.25	0.26	0.25	0.25	\	\
Knoop hardness (kg / cm^2)	404	347	302	382	549	343	423
fracture toughness (Mpa.m1 / 2)	0.58	0.62	0.66	0.68	0.74	0.35	0.58
Deliquescence coefficient (H_2O 98℃) (mg / (cm^2 /day))	\	0.41	2.2	0.003	0.002	\	\

SPECTRA