Laser rods - Neodymium doped

Crytur delivers high quality laser rods based on proprietary crystals and in-house processing and coating

ND:YAG RODS **ND:YAP RODS**

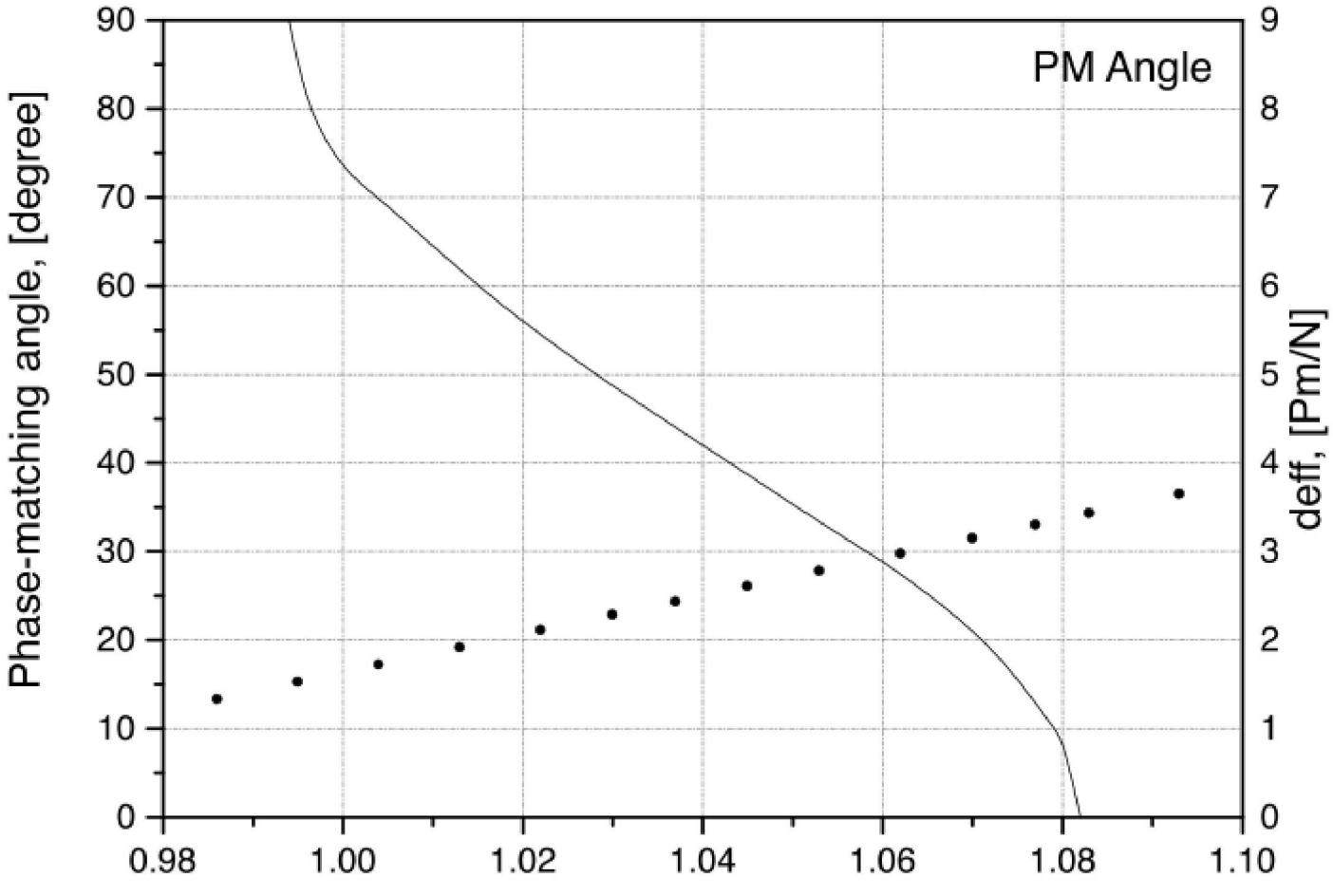
Our standard production of Nd:YAP laser rods includes Nd dopant concentrations from 0.25 % up to 1.1 at. % of Nd/Y.

Nd:YAP laser rods with 0.7 at. % Nd/Y are typically used for CW and 0.9 at. % Nd/Y for pulsed lasers, both with the “b” orientation.

The threshold and slope efficiency of Nd:YAP at 1079 nm are comparable to those of Nd:YAG at 1064 nm. Rods cut along the “b” axis are suited for most of applications.

Linear polarization, no thermal birefringence and easy generation of 1.3 μm wavelength are the main advantages of this material.

The 1340 nm emission wavelength of Nd:YAP has higher absorption in water and bodily fluids in comparison with the 1319 nm emission wavelength of Nd:YAG.



Taking into account the polarized output beam, Nd:YAP can be advantageously utilized in lasers with electro optic cells or harmonic generators. The wavelength of 1079 nm em itted by Nd:YAP can realize type II non-critical phase matching in an α-cut KTP crystal, where the effect of beam walk-off is eliminated and the conversion efficiency is increas ed compared to angular phase-matching.

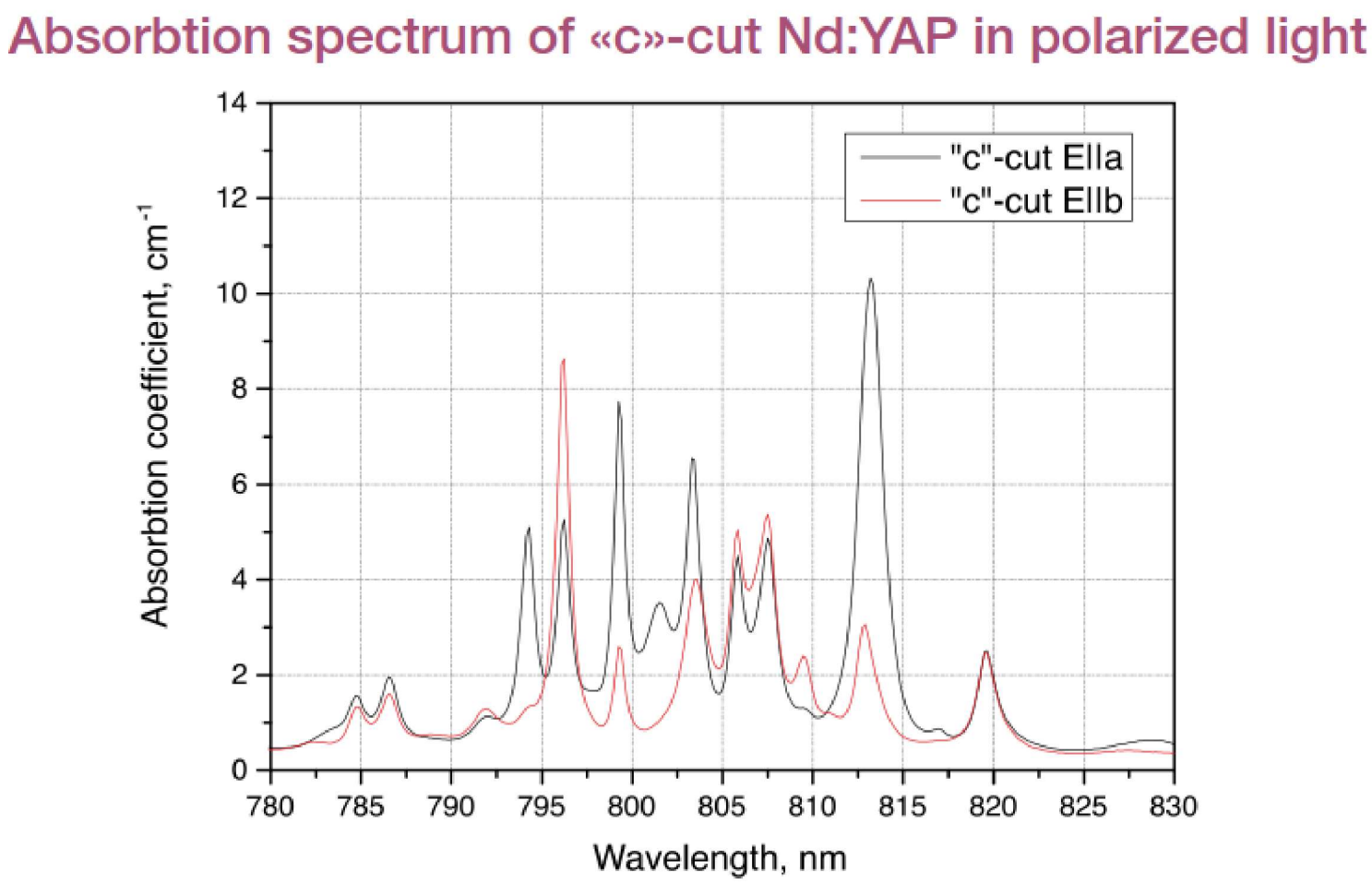
MATERIAL PROPERTIES	
Host	Yttrium aluminium perovskite ($YAlO_3$)
Dopant	Nd^{3+}
Crystal structure	orthorhombic - Pbnm
Unit cell dimensions (Pbnm notation)	a_0= 0.518 nm
	b_0= 0.531 nm
	c_0= 0.736 nm
Refractive index at 1064 nm	1.914 (n_a)
	1.925 (n_b)
	1.940 (n_c)
Thermal expansion coefficient	||a: 9.5 x 10^{-6} / K
	||b: 4.3 x 10^{-6} / K
	||c: 10.8 x 10^{-6}/ K
Thermal Conductivity	11 W/m K
Density	5.35 g/cm^3
Hardness by Mohs	8.5
Fluorescent lifetime (1% Nd)	170 µs

Linear dispersion $\delta n/\delta T$ [$10^{-6}K^{-1}$]	9.7 (n_a)	
Laser wavelengths	$^4F_{3/2} \rightarrow {}^4I_{9/2}$	930 nm
	$^4F_{3/2} \rightarrow {}^4I_{11/2}$	1079 nm
	$^4F_{3/2} \rightarrow {}^4I_{13/2}$	1340 nm
	$^4F_{3/2} \rightarrow {}^4I_{13/2}$	1432 nm

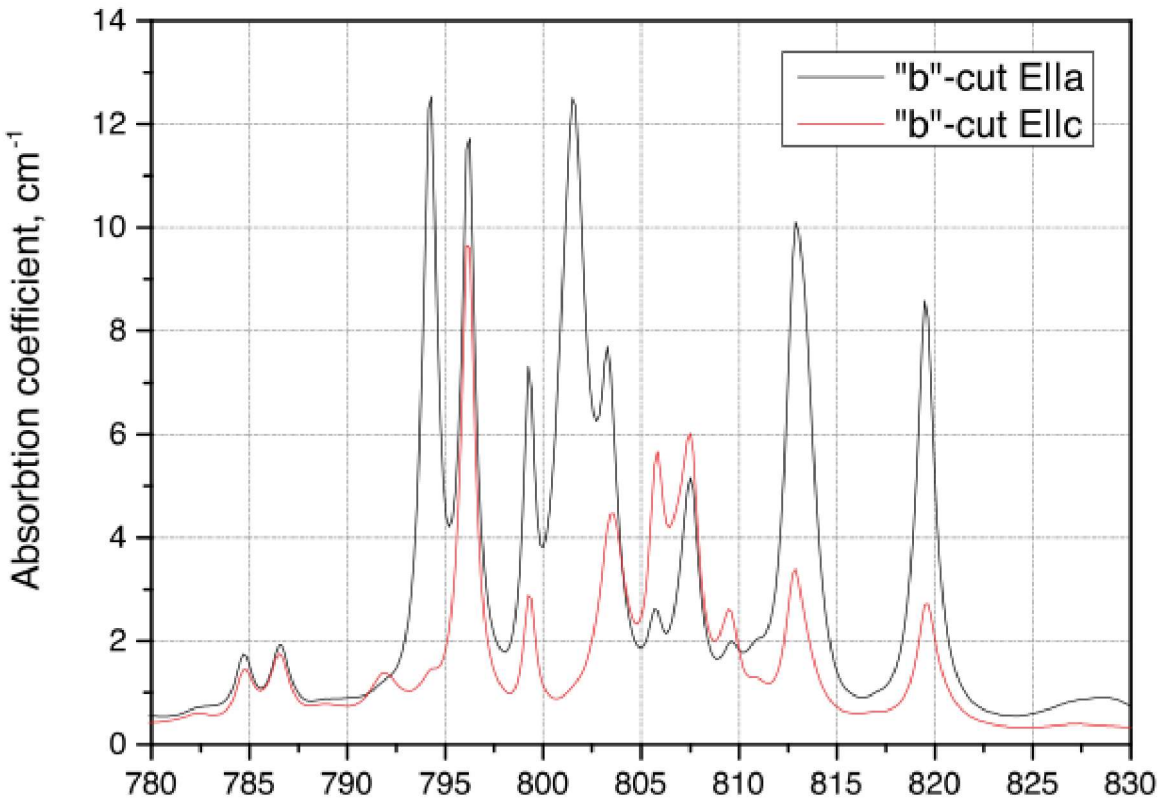
Emission cross sections of Nd:YAP in dependence on its crystallographic orientation.
(Ref. A. A. Kaminskii, Laser Crystals, New York: Springer Verlag 1981).

WAVELENGTH [NM]	EMISSION CROSS SECTION [10^{-19} CM^2]		
	a-cut	b-cut	c-cut
1079	2.05	1.76	1.38
1340	1.13	0.97	0.78
1432		0.34	

The main absorption line of the Nd:YAG crystal occurs at 808 nm. In case of Nd:YAP the peak of the absorption depends on crystallographic direction on Nd:YAP and polarizat
ion.



Absorbtion spectrum of «b»-cut Nd:YAP in polarized light



Absorbtion spectrum of Nd:YAP in unpolarized light