



DESCRIPTION

YCOB crystal is one of the most widely used nonlinear optical crystals. Its nonlinear optical coefficient is equivalent to that of BBO crystal and LBO crystal. The effective frequency multiplication coefficients of the second and third order reach 2, 8 and 1, 4 times of KDP respectively. The YCOB crystal has the following advantages: large aperture, high damage intensity in femtosecond regime, about 2000-2500 GW/cm² wide allowable angle range and allowable temperature range, small dispersion angle, shorter growth period by Cz method. At the same time, it has stable physical and chemical properties (non-deliquescent) and good machining properties. Therefore, it is considered to have good application prospects of blue-green light and UV band optical frequency multiplier crystal.

YCOB (YCa₄O(BO₃)₃, Yttrium Calcium Oxyborate)—Nonlinear crystal considered to have good prospects of UV band optical frequency multiplier

One of the latest technical achievements connected with YCOB is the generation of 2.35-W CW green output ($\lambda = 532$ nm) in a 1.2-cm-long crystal ($\theta = 64.5^\circ$, $\varphi = 35.5^\circ$) via inter cavity SHG of a diode-array end-pumped Nd:YVO₄ laser ($P = 5.6$ W). Another similar application is THG of Nd:YVO₄ laser radiation. Using the KTP crystal for frequency doubling and a 1.1-cm-long YCOB crystal ($\theta = 106^\circ$, $\varphi = 77.2^\circ$), the authors managed to obtain 124mW of quasi-CW light (pulse repetition frequency 20 kHz) at 355 nm.

FEATURES

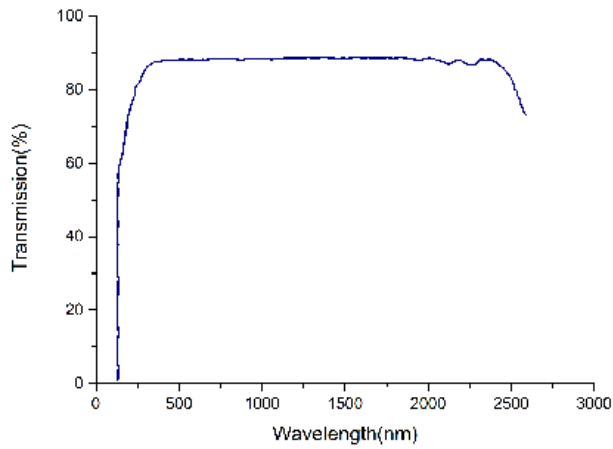
- Electric resistivity is high
- Temperature acceptance is high
- Laser induce damage threshold is high
- Less anisotropy
- Thermal expansion coefficient is small
- Less parametric luminescence

APPLICATIONS

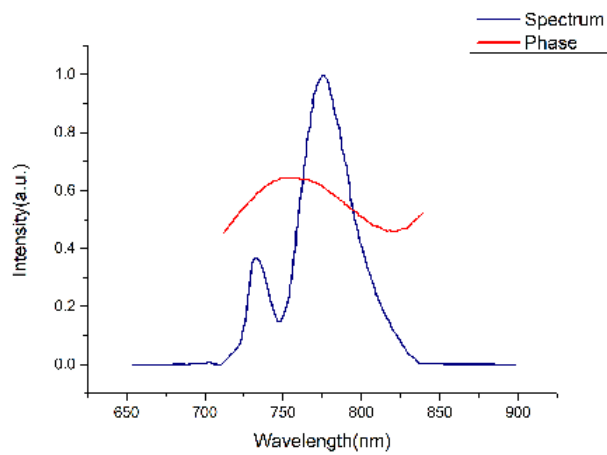
- SHG(second-harmonic generation), THG(third-harmonic generation)
- OPO(optical parametric oscillator)
- OPA(optical parametric amplification)
- OPCPA (optical parametric chirped-pulse amplification)
- Piezoelectric acceleration sensors
- Pressure sensors



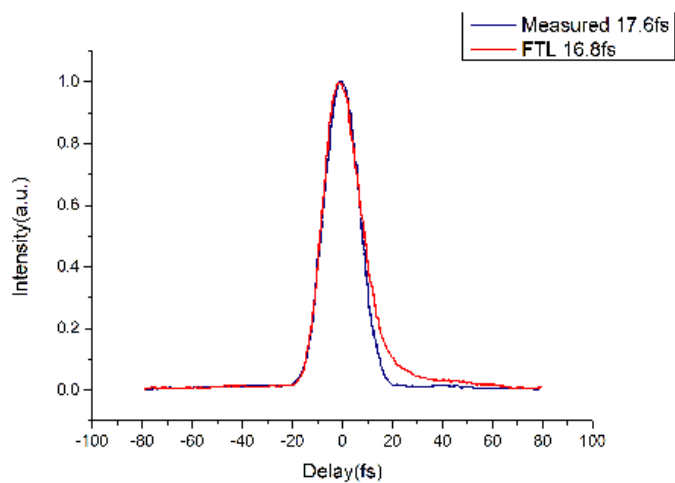
SPECTRA



Transmission Spectrum of YCOB Crystal



The blue line is the spectrum intensity after SHG.
The red line is the measured phase by Wizzler

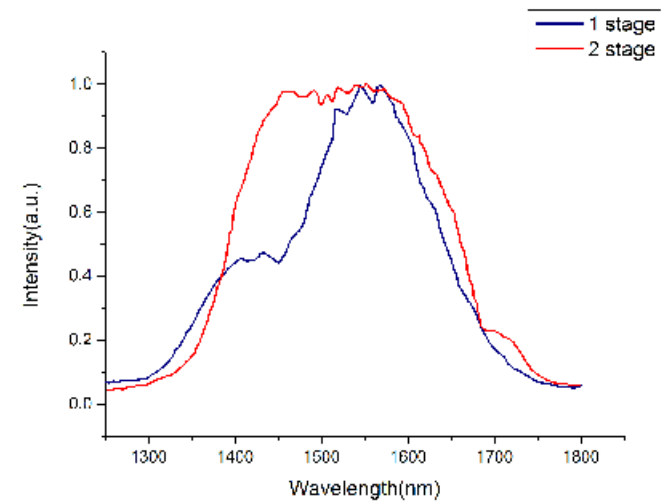


The blue line is the pulse FTL shape after SHG.
The red line is the measured temporal shape by Wizzler.

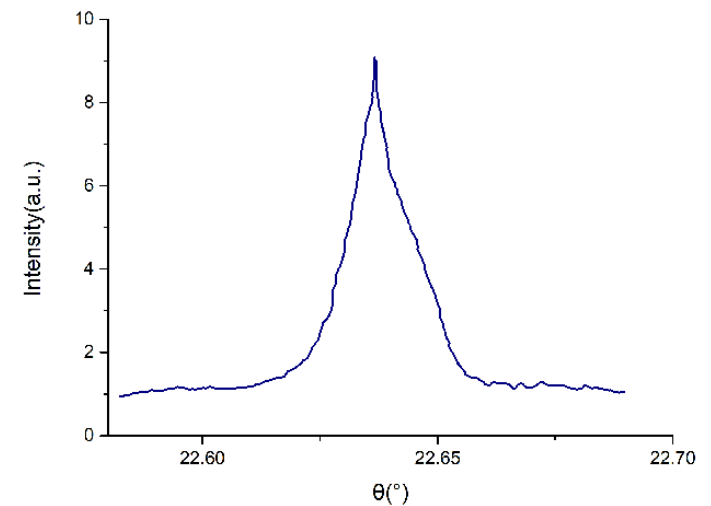
PARAMETER

Chemical and Physical properties

Crystal Structure	Monoclinic, Point group m
Lattice Parameter	a=8.0770 Å, b=16.0194 Å, c=3.5308 Å, β =101.167°, Z=2
Melting Point	About 1510°C
Mohs Hardness	6~6.5
Density	3.31 g/cm ³
Thermal Conductivity	2.6 W/m/K (X), 2.33 W/m/K (Y), 3.1 W/m/K (Z)



OPA spectra obtained by first stage (solid black line) based on BBO crystal and second stage (solid red line) based on YCOB crystal.



X-ray rocking curve of YCOB water

