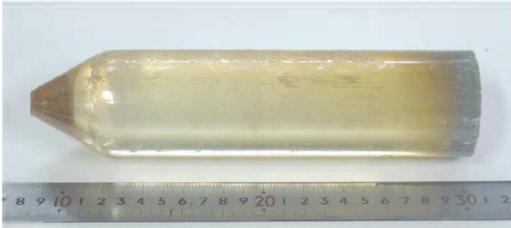


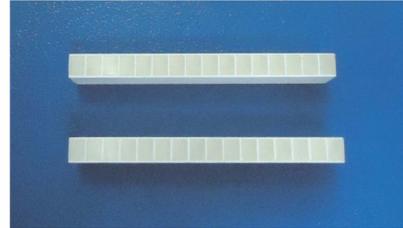
Cadmium Tungstate Scintillation Crystal (CdWO₄, CWO)

Introduction

Cadmium tungstate (CdWO₄, CWO) single crystal is an important scintillation materials applied in the radiation detection technology, especially for security checking , industrial CT and medical imaging. Large-size CWO single crystals with high quality were grown successfully by vertical Bridgman process in our company in recent years. CWO single crystal has a density as high as 7.9 g/cm³ without any deliquescence. Under high-energy rays radiation such as X-rays or γ -rays, the crystal exhibits the luminescence output with a central wavelength of 470 nm. The crystal possesses a series of scintillation properties such as a relative light yield 2~3 times of BGO crystal, a low afterglow only 10-2 grade relative to CsI(Tl) crystal and a γ -ray radiation hardness of 107 rad. Our company provide the mass products of CWO wafers and array elements, which can meet the technical requirements for radiation detection devices.



CWO crystal boule



CWO crystal array elements

Materials Properties of CWO Single Crystal:

| | |
|-------------------------------|---|
| Crystal orientation | <100>, <010> |
| Crystal structure | Monoclinic system, Space group P2/c |
| Crystal lattice | a = 5.029Å, b = 5.859Å, c = 5.074 Å; $\alpha = \gamma = 90^\circ$, $\beta = 91.47^\circ$ |
| Melting point | 1276°C |
| Density | 7.90g/cm ³ |
| Thermal expansion coefficient | $6.39 \times 10^{-6} / \text{K}$ (<100>), $1.09 \times 10^{-5} / \text{K}$ (<010>) |
| Refractive index | 2.3 |
| Hardness | 4.5 Mohs |

| | |
|------------------------------------|---|
| Hardness | 4.5 Mohs |
| Cleavage | (010) |
| Colour | Nearly colorless to pale yellowish brown |
| Deliquescence | None |
| Central wavelength of luminescence | 470 nm |
| Relative light yield index | 20-30 (NaI(Tl) crystal with a light yield index 100 is used as reference) |
| Absolute light yield | 2760 50 p.e /MeV |
| Energy resolution | 7.8-12% |
| Luminescence decay time | 1.3 μ s (36%, fast), 11.5 μ s (64%, slow) |
| Afterglow | less than 0.04%@3 ms |
| γ -ray radiation hardness | 107 rad |

Figures

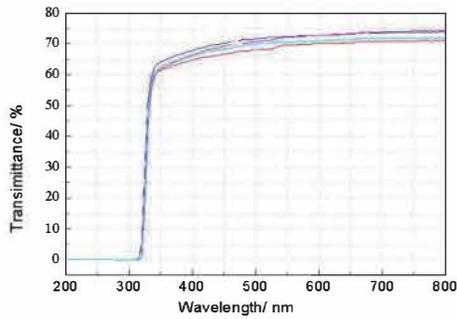


Fig. 1 Ultraviolet-visible transmission spectra

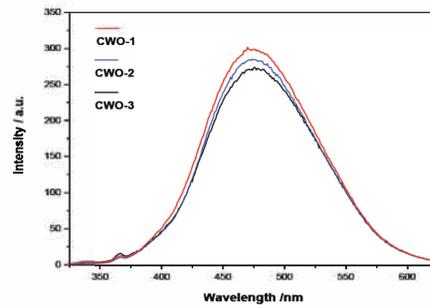


Fig.2 X-ray stimulated luminescence spectra

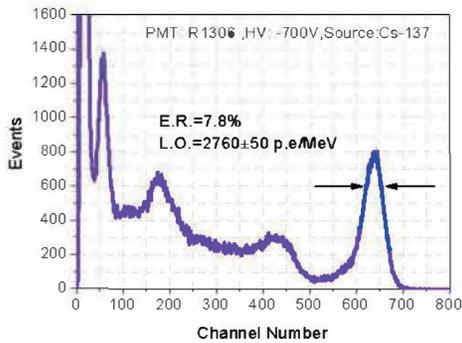


Fig. 3 Energy spectrum and light yield of CWO wafer under γ -ray excitation

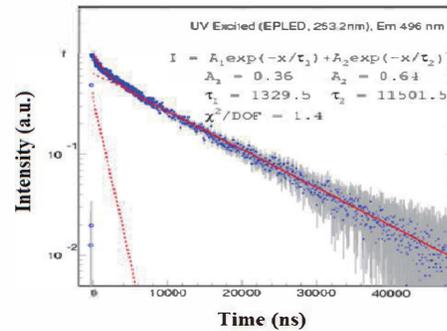


Fig. 4 Luminescence decay time of CWO wafer under UV excitation

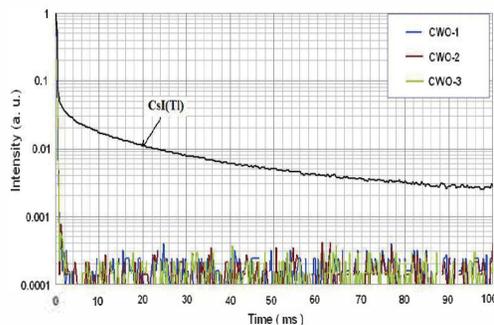


Fig. 5 Afterglow of CWO crystal less than 0.04%@3ms under γ -ray excitation which only 10-2 grade relative to CsI(Tl) crystal

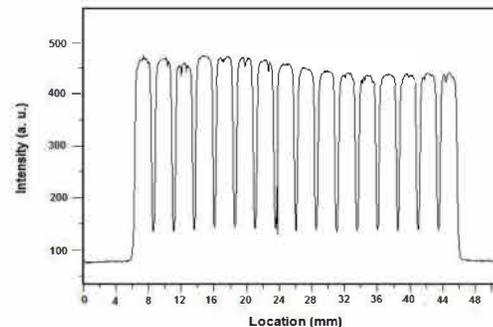


Fig.6 Relative light yield uniformity of crystal array elements

公司简介 INTRODUCTION



CASTECH INC.

(CASTECH) was founded by Fujian Institute of Research on the Structure of Matter, Chinese Academy of Science in 1988. Thanks to long term interactive partnership with the leaders in laser system manufacturing industry and ongoing efforts of our employees, we have established the largest mass production lines in the world for LBO, BBO, Nd:YVO₄ and TGG crystals, and implemented a complete quality control system for our products.

CASTECH is now a worldwide leading supplier of nonlinear optical crystals, laser crystals, precision optics, and a variety of laser components. In CASTECH, there are Flux/Czochralski/Water Solution/Bridgman Crystal Growth production lines, Crystal Orientation and Dicing workshop, Optical Polishing workshop and Optical Coating workshop with IBS, IAD, MS and EB coating technique. Our commitments are backed by our huge manufacturing capacity.

CASTECH's quality system is IATF 16949:2016 and ISO 9001:2015 certified. We have established a complete system for outgoing parts inspection. Our optical testing equipments include Zygo Interferometers, Agilent Cary 7000, Perkin-Elmer Lambda 950, Nikon Microscope, Photo-Thermal Common-Path Interferometers, Zygo Newview 8300, Taylor Hobson LupoSan 260, Extinction Ratio Measurement and Ellipsometers. These equipments along with many others, ensure that we comply with all specifications for our products.

Today, over 60% of CASTECH's products are exported to USA, Japan, Europe and other Asia Market. We have established a global sales network. We have set up our agencies and distributors in the main industrial countries and districts.

Our mission is to deliver the best products and solutions to our customers in photonics industry, and help them to realize their full potential in business. Here at CASTECH, we value comity, integrity, honesty, and innovation.