

CdWO₄

Cadmium tungstate



Description

Cadmium tungstate CdWO₄ (CWO), due to its low intrinsic background and afterglow together with sufficiently high light yield, is the most promising for spectrometry and radiometry of radio nuclides under extremely low activities, and also for computer tomography.

The crystal is transparent and emits light when it is hit by gamma rays and x-rays, making it useful as a detector of ionizing radiation. Its peak scintillation wavelength is 480 nm (with emission range between 380-660 nm), and efficiency of 13000 photons/MeV. It has a relatively high light yield, its light output is about 40% of NaI(Tl), but the time of scintillation is quite long (12~15 μ s). It is often used in computed tomography. Combining the scintillator crystal with externally applied piece of boron carbide allows construction of compact detectors of gamma rays and neutron radiation.

Features

- Low afterglow
- Mechanically robust characteristics and are non-hygroscopic
- Withstands high energy radiation damage
- High density, high Z scintillator
- Relatively high light yield
- Virtually no afterglow

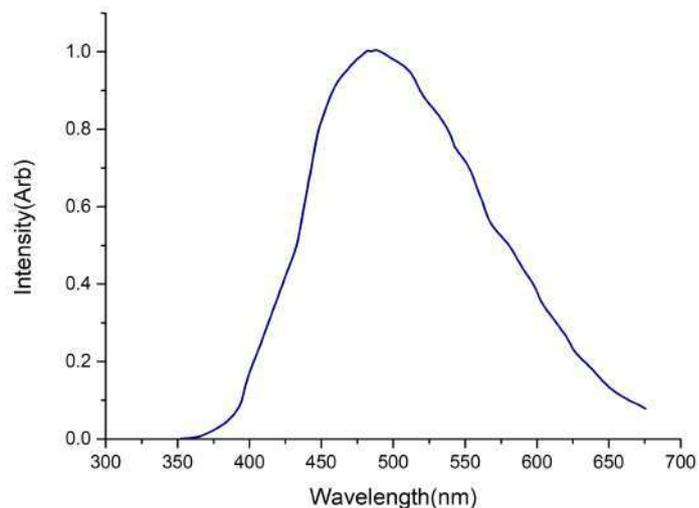
Applications

- Positron Emission Tomography (PET)
- Compton suppression spectrometers
- Geological logging
- Hard tissue removal
- Security - Luggage, container and cargo scanning

Parameters

Chemical Formula	CdWO ₄
Density [g/cm ³]	7.9
Light yield (Photon/MeV)	13000
Decay time (μ s)	12-15
Peak emission (nm)	480
After glow	0.1%@6ms
Melting point [K]	1598
Thermal expansion coefficient [C ⁻¹]	10.2x10 ⁻⁶
Cleavage plane	<010>
Hardness (Mho)	4 - 4.5
Hygroscopic	no
Wavelength of emission max [nm]	475
Lower wavelength cutoff [nm]	330
Refractive index @ emission max.	2.2 - 2.3

Emission Spectrum



Polishing Standard

Polishing Specification for Optical Grade				
	Standard	Precision	High Precision	Super Precision
Orientation Tolerance	< 1°		< 0.5°	< 0.2°
Thickness/Diameter Tolerance	±0.10 mm		±0.05 mm	±0.02 mm
Surface Flatness@633nm	<λ-2λ		<λ/2-λ/4	λ/4-λ/6
Wavefront Distortion	<(2-4)λ		<(1-2)λ	<(λ-λ/2)
Surface Quality	60/40		40/20	20/10
Parallel	45"		1'	10'
Perpendicular	60'		30'	20'
Clear Aperture			>90%	
Chamfer			<0.2mm×45°	
Coating			Available upon request	