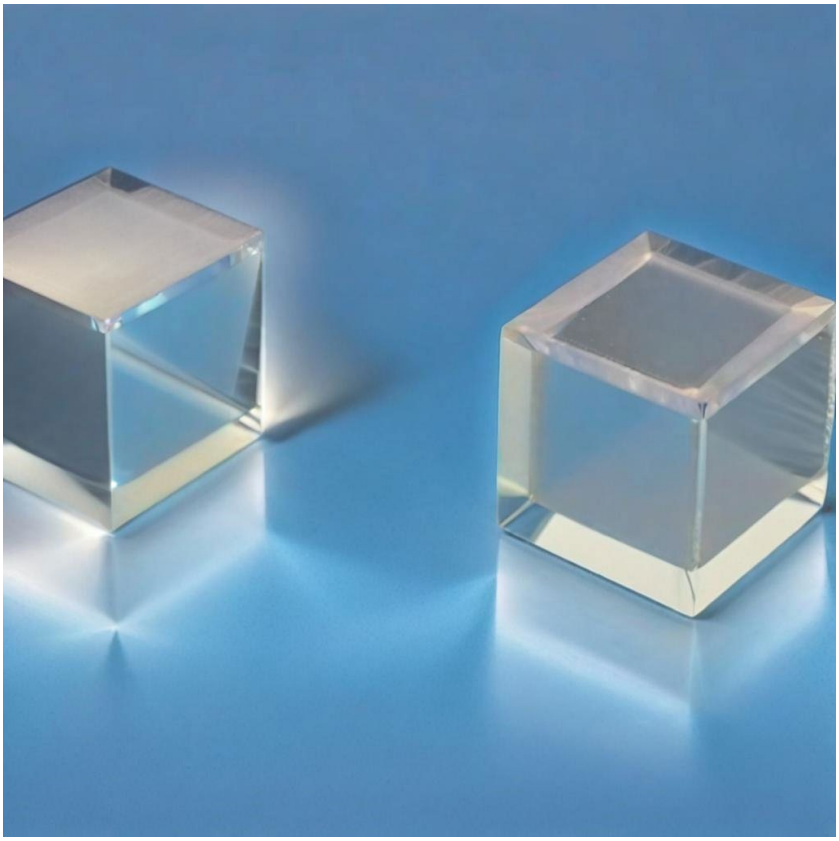
Photonics On Crystals

POC-OC-122470-KYW Crystal Datasheet

1 Main Features

- Wide transparency range from 350 nm to 5.5 µm.
- Two prominent Raman shifts at 765 cm^{-1} and 905 cm^{-1}.
- High optical damage threshold for advanced laser applications.
- Excellent thermal conductivity for efficient energy transfer.
- Customizable dimensions, orientation, and coatings available upon request.



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2. Material General Description

Potassium Yttrium Tungstate ($KYWO_{42}$) is a high-performance Raman crystal used extensively in advanced laser systems. KYW crystals exhibit broad transparency, ranging from 350 nm to 5.5 µm, making them suitable for various laser-based applications. Their high thermal conductivity, which is approximately three times higher than barium nitrate, ensures efficient heat dissipation during high-power operations.

KYW crystals are specifically designed for Raman frequency shifting, featuring two large Raman modes at 765 cm^{-1} and 905 cm^{-1}. The crystals offer good mechanical properties, high optical damage thresholds, and superior radiation frequency tuning capabilities. These properties make KYW crystals ideal for high-intensity laser applications.

Photonics On Crystals

Photonics On Crystals (POC) ensures consistent quality, competitive pricing, and customizable options tailored to specific requirements.

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3. General Applications and Examples

KYW crystals are widely utilized in:

- **Raman Lasers**: Used for achieving precise wavelength conversion and enhanced laser output power. KYW's dual Raman shifts make it ideal for high-performance Raman generators.
- **Radiation Frequency Tuning**: The crystal's broad transparency range facilitates the tuning of frequencies for scientific and industrial applications.
- **Medical Lasers**: Due to their high thermal conductivity and broad transparency, KYW crystals are used in advanced medical lasers for precise surgical procedures.
- **Defense and Research**: KYW crystals are integral in high-energy laser systems for defense, spectroscopy, and research applications, where precision and durability are critical.

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4. Chemical, Physical, and Structural Properties

Property	Value
Chemical Formula	$K(YWO_4)_2$
Crystal Structure	Monoclinic, C2/c
Lattice Parameters	a = 10.64 Å, b = 10.32 Å, c = 7.55 Å
Density	6.61 g/cm³
Mohs Hardness	4–5
Transparency Range	0.35 µm – 5.5 µm
Thermal Conductivity (average)	3.3 W/m·K
dn/dT (Refractive Index Temperature Coefficient)	$dn/dT_x = -1.4 \times 10^{-4}\ K^{-1}$ $dn/dT_y = -8.9 \times 10^{-5}\ K^{-1}$ $dn/dT_z = -1.2 \times 10^{-4}\ K^{-1}$
Refractive Indices (1064 nm)	$n_x = 1.9868$, $n_y = 2.0055$, $n_z = 2.0367$

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5. Optical, Laser, or Nonlinear Optical Properties

Optical Property	Value
Raman Frequency Shifts	765 cm^{-1} (E
Raman Linewidth	5.4 cm^{-1} (polarization E
Raman Gain Coefficient	3.6 cm/GW (steady-state regime at 1064 nm)

6. Spectrum Transmission Curves

The transmission spectrum of KYW crystals spans from 350 nm to 5.5 µm, offering high transparency across a broad wavelength range, crucial for Raman laser operations. Additional data or graphs available upon request.

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7. Coating Specifications

- **AR Coating**: Available for the 450–800 nm or 450–850 nm ranges. Custom coatings available on demand.
- Reflectance: <0.2% at specific wavelengths.
- High-durability coatings designed for high-power applications.

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8. Standard Fabrication Specifications

Specification	Value
Orientation	b-cut
Clear Aperture	>90%
Face Dimensions Tolerance	+0/-0.1 mm
Length Tolerance	±0.1 mm
Parallelism Error	<20 arcsec
Perpendicularity Error	<10 arcmin
Surface Flatness	<λ/8 @ 632.8 nm
Surface Quality	10-5 S-D
Wavefront Distortion	<λ/8 @ 632.8 nm

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9. POC Strength and Capabilities

Photonics On Crystals (POC) leverages cutting-edge manufacturing technologies to deliver high-quality KYW crystals. Our expertise includes:

- Customizable sizes, orientations, and coatings to meet specific application needs.
- Competitive pricing with rigorous quality assurance for consistent performance.
- Technical support and consultation for optimizing laser system performance.
- Fast delivery for both standard and custom orders.

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10. Standard Products

Face Dimensions	Length	Coatings	Price (USD)
15 mm x 15 mm	5 mm	Uncoated	440
15 mm x 15 mm	10 mm	AR(450–800 nm)	600
5 mm x 5 mm	30 mm	AR(450–800 nm)	780
8 mm x 8 mm	50 mm	AR(450–800 nm)	1120
Customization	Any	Per customer request	TBD

This datasheet provides all relevant details about **KYW Crystals** offered by **Photonics On Crystals (POC)**. For additional technical support or custom requests, feel free to contact our team.