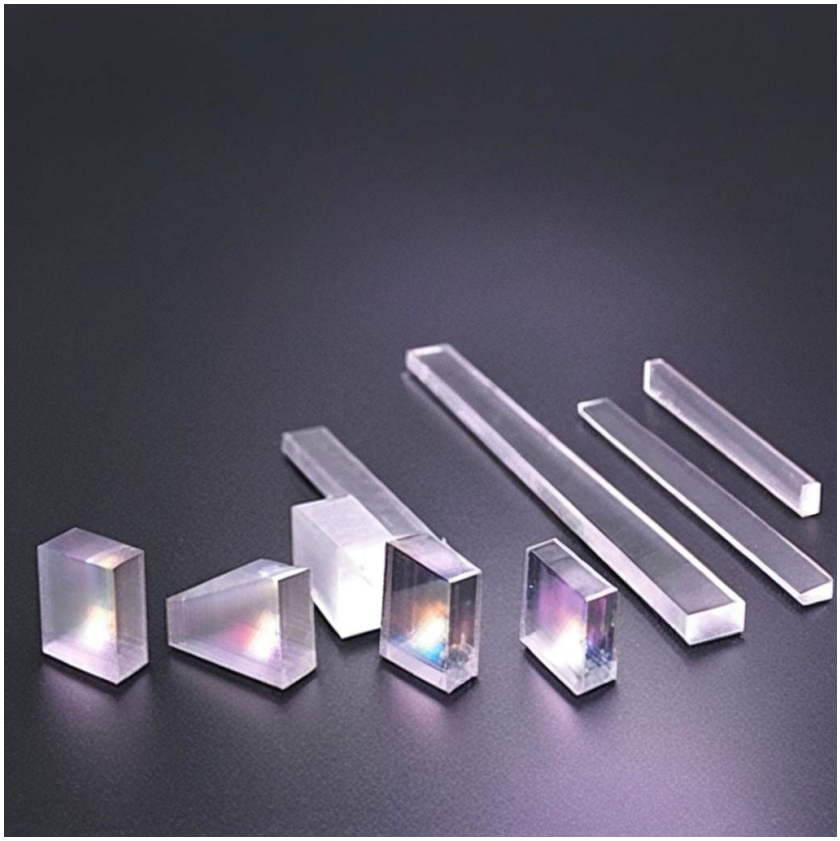
Photonics On Crystals

POC-OC-122498-Eu_2:Caf2 Crystal Datasheet

1 Main Features

- High density and excellent scintillation properties.
- Short decay constant for high-speed radiation detection.
- Superior emission peak at 435 nm, ideal for radiation monitoring.
- High mechanical stability with a Mohs hardness of 4.
- OEM customization options for specialized applications.



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2. Material General Description

Europium-doped Calcium Fluoride (Eu_2:CaF_2) is a high-performance scintillation crystal widely used in radiation detection and medical diagnostic devices. The crystal's cubic structure, combined with its high density (3.18 g/cm³) and short decay constant (940 ns), enables rapid and efficient detection of radiation, making it ideal for nuclear physics experiments, reactor monitoring, and advanced imaging systems. Its emission peak at 435 nm ensures compatibility with various optical systems.

Eu_2:CaF_2 crystals exhibit excellent optical clarity and uniformity, enhancing their performance in precision applications. Their durability, combined with low refractive index (1.47), ensures longevity and stable operation in demanding environments.

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3. General Application and Examples

Eu_2:CaF_2 crystals find applications in:

- **Nuclear Physics**: Ideal for high-energy particle detection due to their rapid decay and high-density properties.
- **Radiation Monitoring**: Used in nuclear reactors for detecting radiation levels with precision.
- **Medical Imaging**: Advanced scintillation properties enable use in diagnostic devices for detecting radioactive isotopes.
- **Spectroscopy**: Compatible with spectroscopic systems for precision measurement.
- **Scientific Research**: Utilized in low-energy experiments and high-resolution detection systems.

For instance, in radiation monitoring, Eu_2:CaF_2 enables real-time detection due to its short decay time. Its emission at 435 nm is tailored for optical systems used in radiation detectors.

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4. Chemical, Physical, and Structural Properties

Attribute	Value
Density	3.18 g/cm³
Melting Point	1360 °C
Refractive Index	1.47
Emission Peak	435 nm
Decay Constant	940 ns
Mohs Hardness	4
Crystal Structure	Cubic System
Cleavage Plane	(111)

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5. Optical and Scintillation Properties

Optical Property	Value
Light Output	8.6%
Radiation Length	17 mm
Transparency Range	UV to visible light
Optical Density	Tunable

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6. Spectrum Transmission Curve

The emission spectrum demonstrates a sharp peak at 435 nm, aligning with radiation detection devices. Data for the exact curve can be provided upon request.

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7. Coating Specification

Custom anti-reflective (AR) coatings are available upon request, designed to enhance transmission at 435 nm and improve detection efficiency.

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8. Standard Fabrication Specifications

Specification	**Value**
Surface Flatness	< λ/8 @ 632.8 nm
Parallelism	< 20 arcseconds
Perpendicularity	90° ± 15 arcminutes
Surface Quality	10-5 Scratch-Dig
Maximum Dimensions	Customizable (varies)

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9. POC Strength and Capabilities

Photonics On Crystals (POC) excels in material processing, ensuring high-quality fabrication of Eu_2:CaF_2 crystals. POC offers:

- Precision cutting and polishing to meet exact specifications.
- Expertise in advanced coating technologies for radiation detection.
- Comprehensive customization to suit diverse applications.

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10. Standard Products and Customization

Dimension (mm)	**Coating**	**Price (USD)**
10 x 10 x 1	AR@435 nm	250
15 x 15 x 2	AR@435 nm	350
20 x 20 x 2	AR@435 nm	500
Custom	Upon request	Quote available

If you require additional information or customized options, feel free to contact Photonics On Crystals (POC).

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