

Product Information

Cerium(III) Fluoride Patinal®

GENERAL INFORMATION

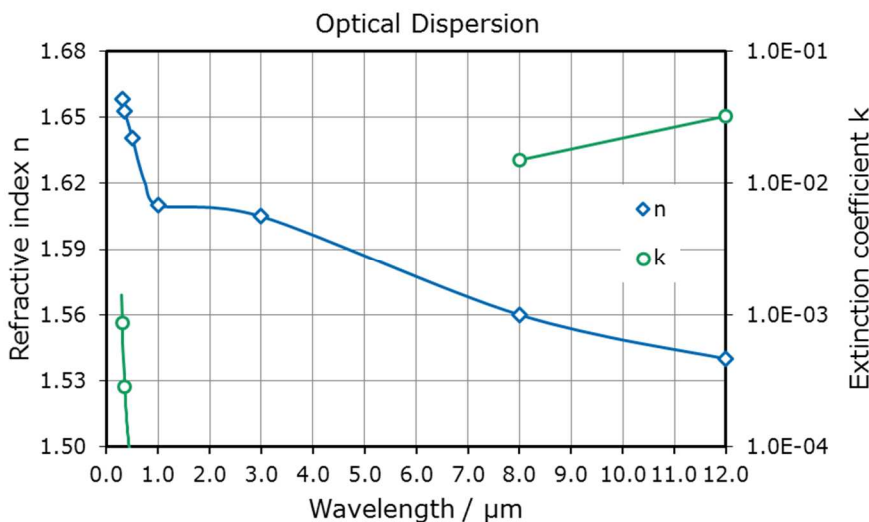
Thin films made from Substance Cerium(III) Fluoride Patinal® can be used for optical coatings from the UV to the MIR spectral range and show very good durability. They pass environmental tests of moderate abrasion (tape and adhesion tests) even after 24 hours of humidity.

AREAS OF APPLICATION

- Interference filters in UV, VIS, IR, multi bandpass filters
- Alternative to thorium fluoride for coatings in the IR spectral range

THIN FILM PROPERTIES

Range of transparency	300 nm – 13 µm
Refractive index	
• at 500 nm	~ 1.64
• at 10 µm	~ 1.55
Thin film stress	Tensile (low)



wavl / μm	0.3	0.5	1.0	3.0	8.0	10.0	12.0
n	1.66	1.64	1.61	1.09	1.56	1.55	1.54
k	1.4E-03	6.7E-05	2.0E-05			1.5E-02	3.0E-02

Cerium(III) fluoride films on glass can be removed with hot sulfuric acid or with a mixture of hot sulphuric acid and 3 % boron trioxide.

NOTES FOR EVAPORATION

Evaporator source	Resistance heated evaporator Electron beam evaporator
Boat / liner	Mo, Ta-liner Mo, Ta or W-boat
Evaporation temperature	~1400 - 1600 °C
Deposition rate	0.6 – 1 nm/s
Substrate temperature	250 – 300 °C
QCR-settings	Density 6.16 g/cm ³ , z-ratio 0.661

Cerium fluoride evaporates without decomposition. However, the melt can react with the boat material, therefore evaporation by electron beam is preferable. E-beam evaporation requires well optimized e-beam settings with low energy density. The properties of vapor deposited cerium fluoride films depend on the evaporation conditions. Hard, compact and very durable films are obtained at substrate temperatures of 250 to 300 °C, high evaporation rates around 1 nm/s and low pressures.



PRODUCTS

Cerium(III) Fluoride Patinal® is available as granules.

Product Code	Description	Purity*	Dimensions
1.02269	Cerium(III) Fluoride Patinal®	4N	Granules, about 1 – 4 mm

* The purity values are based on the specified trace metals.

Appearance

1.02269	White granules
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SPECIFICATION

Cobalt (Co)	≤ 0.001 %	Sizes	1.02269	granules 1 - 4 mm ≥ 80 %
Copper (Cu)	≤ 0.001 %			
Chromium (Cr)	≤ 0.001 %	Application test		Each batch has to pass a specific application test assessing its evaporation behaviour.
Iron (Fe)	≤ 0.002 %			
Vanadium (V)	≤ 0.001 %			
Oxygen (O)	≤ 0.2 %			

RoHS information

The RoHS compliance information is part of the Certificate of Analysis (CoA) for each batch of Patinal® material.



Quality assurance

Research, production and sales of our Patinal® evaporation materials take place under a certified DIN EN ISO 9001 quality management system and DIN EN ISO 14001 environmental management system. The quality of the materials is assured by our manufacturing processes, in-process controls and quality tests. Each batch is released only after passing our chemical analysis and application tests designed to confirm the suitability of the material for the evaporation process.

Handling precautions

Product safety information required for safe use is not included in this document. Before handling, read product and safety sheets and container labels for safe use, physical and health hazard information. The material safety data sheet is available online at www.patinal.com, from your EMD representative or distributor, or by calling your global Merck KGaA, Darmstadt, Germany, contact.

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