

**Product Information**

# Neodymium Fluoride Patinal®

## GENERAL INFORMATION

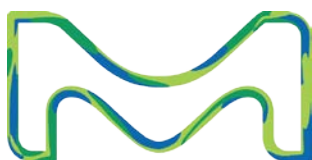
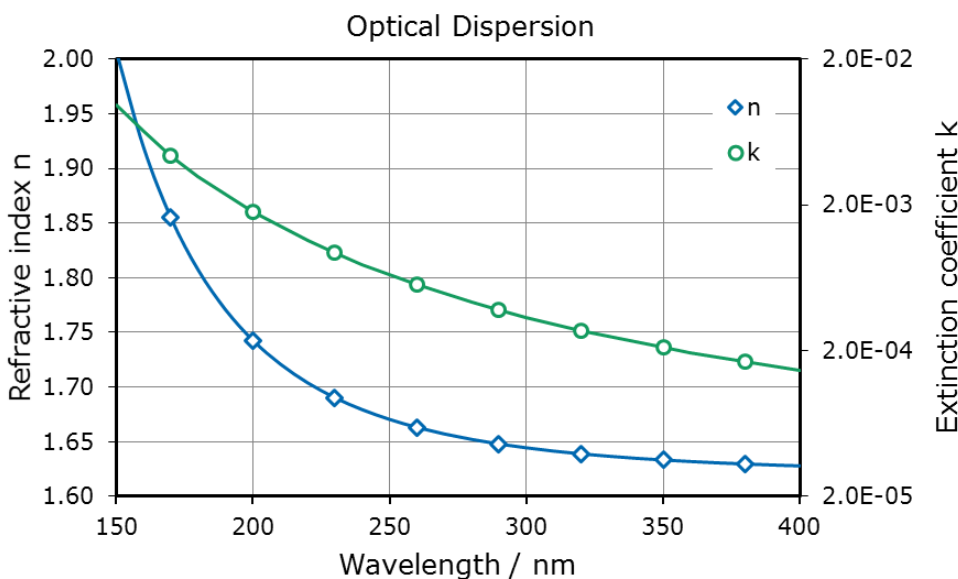
Neodymium Fluoride Patinal® (NdF<sub>3</sub>) is used as a high index material for optical multilayer coatings in the UV spectral range.

## AREAS OF APPLICATION

- High index material for DUV / VUV multilayer coatings, e.g. at 193 nm (ArF excimer laser)

## THIN FILM PROPERTIES

Range of Transparency	170 nm - 14 μm
Refractive index at 190 nm	
<ul style="list-style-type: none"> <li>• conventional T<sub>s</sub> = 300 °C / no IAD</li> </ul>	1.77
Thin film stress	Tensile



wavl / nm	170	200	230	260	290	320	380
n	1.855	1.743	1.690	1.663	1.648	1.639	1.630
k	4.4E-03	1.8E-03	9.4E-04	5.7E-04	3.8E-04	2.7E-04	1.7E-04

Neodymium fluoride shows very weak absorption bands in the VIS wavelength range at 353, 520 and 575-580 nm. Coatings made from NdF<sub>3</sub> have a lower LIDT than LaF<sub>3</sub> at 193 nm, but it is very suitable for coatings at 248 nm.

## NOTES FOR EVAPORATION

Evaporator source	Resistance heated evaporator
Boat	Molybdenum, copper
Evaporation temperature	1200 – 1600 °C
Deposition rate	~0.6 nm/s
Substrate temperature	250 - 300°C
OCR-settings	Density 6.506 g/cm <sup>3</sup> , z-ratio 1.0



## PRODUCTS

Product Code	Description	Purity*	Dimensions
1.06739	Neodymium Fluoride Granules Patinal®	≥ 99.95 % (3N5)	Granules, about 1 – 4 mm

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

### Appearance

1.06739	Brown-violet
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## SPECIFICATION

Calcium (Ca)	≤ 0.005 %
Cerium (Ce)	≤ 0.002 %
Cobalt (Co)	≤ 0.005 %
Copper (Cu)	≤ 0.005 %
Chromium (Cr)	≤ 0.005 %
Iron (Fe)	≤ 0.005 %
Manganese (Mn)	≤ 0.005 %
Lead (Pb)	≤ 0.01 %
Praseodymium (Pr)	≤ 0.005 %
Oxygen (O)	≤ 0.1 %

### Sizes

1.06739	Granules 1 - 4 mm ≥ 80 %
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### Application test

Each batch has to pass a specific application test assessing its evaporation behaviour.

### 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 9001:2000 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](http://www.patinal.com), from your EMD representative or distributor, or by calling your global Merck KGaA, Darmstadt, Germany, contact.

## Disclaimer

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