

Product Information

Silicon Monoxide Patinal®

GENERAL INFORMATION

SiO is a commonly used material for a wide variety of applications with the emphasis on IR multilayer coatings and adhesion promotion. SiO sublimates and should preferably be evaporated from resistance heated boats.

AREAS OF APPLICATION

- Multilayer coatings especially for the IR, but also the VIS range
- Adhesion promoter (VIS, NIR)
- Electronics: dielectric, insulating and protective layers
- Design: iridescent coatings, colored metallically reflecting coatings e.g. on sun glasses
- Web coating: barrier layers on polymer films

THIN FILM PROPERTIES

The optical properties of layers made from SiO depend very much on the evaporation conditions (reactive oxygen, ion assistance) and the resulting oxidation state and layer structure.

	SiO	Si ₂ O ₃	SiO ₂
Range of Transparency	800 – 9000 nm	380 – 9000 nm	190 – 9000 nm
Refractive index	1.8 (1 μm), 1.6 (7 μm)	1.55 (500 nm)	1.46 (550 nm)
Dielectric constant	5 – 9	1.55	1.46
Dielectric loss (tan δ)	0.02 – 0.16	0.001 – 0.02	0.6 – 1·10 ⁻³
Resistivity	10 ⁷ – 10 ¹² Ω cm	10 ¹² – 10 ¹⁶ Ω cm	10 ¹⁷ Ω cm
Color	Yellow / brown	Colorless	Colorless



NOTES FOR EVAPORATION

Evaporator source	Resistance heater thermal evaporation Electron beam evaporator
Boat / Liner	Molybdenum, tungsten, tantalum
Evaporation temperature	1200 – 1600 °C
Deposition rate	~ 0.8 nm/s (SiO), ~ 0.4 nm/s (Si ₂ O ₃)
Oxygen partial pressure	< 2·10 ⁻⁵ mbar (SiO), 1 - 3·10 ⁻⁴ mbar (Si ₂ O ₃)
QCR-settings	Density 2.13 g/cm ³ , Z-ratio 0.870

PRODUCTS

Product Code	Description	Purity*	Dimensions
1.07716	Silicon Monoxide Granules Patinal®	≥ 99.99 % (4N)	Granules, about 2 – 4 mm
1.10553	Silicon Monoxide Granules Patinal®	≥ 99.99 % (4N)	Granules, about 4 – 8 mm

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

Appearance

1.07716	Anthracite grey
1.10553	Anthracite grey



SPECIFICATION

Cobalt (Co)	≤ 0.0005 %
Copper (Cu)	≤ 0.002 %
Chromium (Cr)	≤ 0.001 %
Iron (Fe)	≤ 0.005 %
Vanadium (V)	≤ 0.0005 %

RoHS information

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

Sizes	
1.07716	Granules 2- 4 mm ≥ 80 %
1.10553	Granules 4 -8 mm ≥ 80 %

Application test

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



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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