

α - Alumina Coating

Heraeus High Performance Coatings

Description

α – Alumina Coating applied by aerosol deposition is a cost-efficient high-performance ceramic coating for electrical insulation with very good adhesion, anti-wear purposes and encapsulation in high-temperature applications.

Potential fields of application are Sensors, Batteries, Power-Electronics, Medical components, Vacuum technology

Substrates: Metals, ceramics, glass, polymers, silicon

Key benefits

- Room temperature coating process
- Low Vacuum
- No chemical reaction or phase transition
→ alpha-alumina films in one step
- High deposition rate
- Excellent adhesion
- Dense and crack-free
- No pretreatment of substrates necessary

General film properties

Film thickness: 0,5 μm – 30 μm

Homogeneity: $\pm 15\%$ of film thickness

Film composition: $\alpha\text{-Al}_2\text{O}_3$

Purity: up to 99,999 %

Roughness: Conform to substrate
(e.g. Ra = 0,12 μm on silicon wafer)

Typical mechanical properties

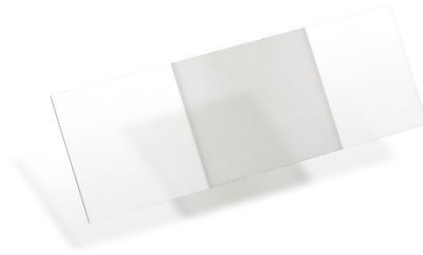
Adhesion: > 30 MPa

Hardness: ~ 850 HV 0,015

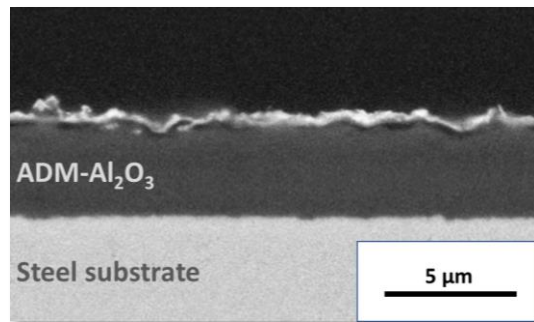
Abrasion: increased resistance of steel by 1500 %
According to ASTM G99-05 with ceramic counterpart

Scratch-Test: Class 0

According to DIN EN ISO 26443 and EN ISO2050:2016



α – Alumina by HPC on glass



SEM cross section of α – Alumina on steel applied by aerosol deposition

Long term reliability

Temperature cycling: 12000 cycles: 900 $^{\circ}\text{C}$ → 20 $^{\circ}\text{C}$

No change in device functionality

Thermo-shock: 1000 cycles: -65 $^{\circ}\text{C}$ ↔ 150 $^{\circ}\text{C}$

Adhesion > 30 MPa, no change in appearance

Physical properties

Breakdown Voltage: > 18 kV/mm

Thermal conductivity: ~ 10 W/mK @ RT

Density: > 99,9%

Transparency: > 80 % @ 1 μm film thickness
and 600 nm



Contact

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