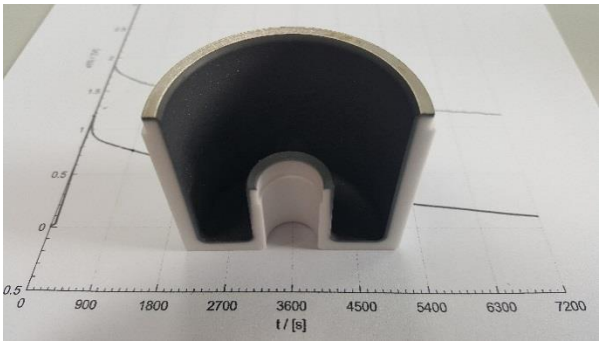
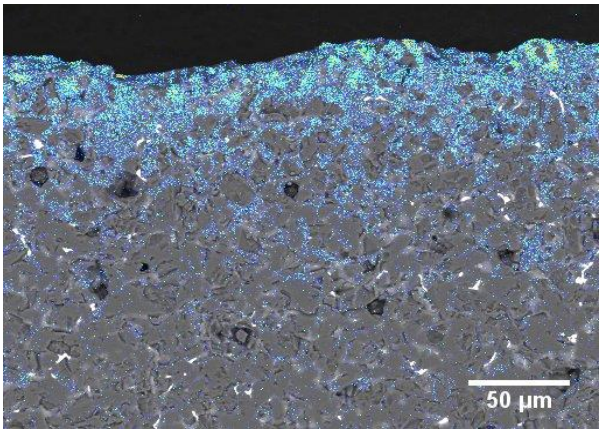
Isolators with charge dissipative coatings

QSIL Ceramics extends the product portfolio

QSIL Ceramics has extended its product portfolio and offers metalized ceramics and brazed ceramic-metal-assemblies with charge dissipative coatings. The surface resistivity of the coated insulators can be tailored between 10^9 and 10^{14} Ohm according to customer requirements.

Property	AK97	AK97M
Classification to EN 60672	C795	C795
Main component [wt.%]	96.7 ...97.3 Al_2O_3	96.7 ...97.3 Al_2O_3
Mean Al_2O_3 grain size [µm]	2 ... 8	10 ... 30
Density [g/cm³]	3.78	3.74
Open porosity [%]	0	0
Coefficient of linear thermal expansion [10^{-6} K^{-1}, 30 ... 1000°C]	8.2	8.5
Heat conductivity [$W \cdot m^{-1} \cdot K^{-1}$]	26	26
Dielectric constant [1 MHz/20°C]	9	9
Dielectric dissipation factor [10^{-3} by 1 MHz/20°C]	<1.0	<1.0
Dielectric strength [$kV \cdot mm^{-1}$]	>15	>30
Specific volume resistivity [Ω·cm]	$>10^{14}$	$>10^{14}$





Cross-section of one insulator with a charge dissipative coating (top) and cross-section through the coating in the surface zone (botom).

Advantages of the charge dissipative coating

- Reduces the tendency for surface charges to build up and dissipates surface charge accumulations in a controlled manner
- Increases the flashover strength and extends the expected service life of the insulators in high-voltage applications under high and ultrahigh vacuum

What is to consider?

- Maximum operating temperature 500 °C in air and 1000 °C in vacuum
- Coating slightly reduces the dielectric strength
- Coated surface cannot be machined afterwards
- Coating can so far only be applied to glass-containing ceramics

Possible application fields

The insulators with charge dissipative coatings find applications as high-performance insulators and feedthroughs in X-ray systems, computer tomography, endoscopes, etc. in medical, safety and materials testing technology. Furthermore, they can be used as insulators in sensors, electron microscopes, accelerator sections, high-power lasers and electron beam systems.