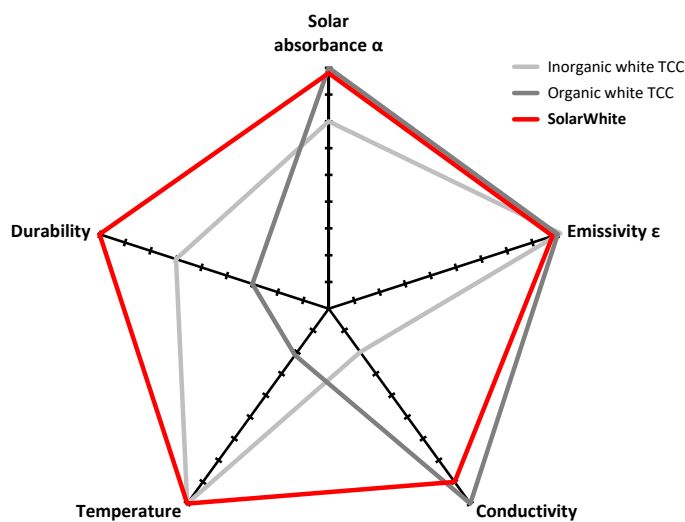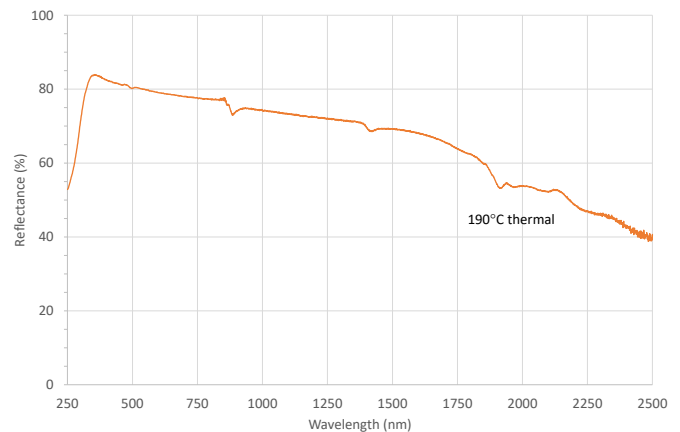# SolarWhite
Thermo-Optical Coating

E N B I O

Undergoing qualification for Solar Orbiter mission

Low solar absorption, high emissivity

Thermally stable (<-180 to >550°C)

UV stable

Inorganic

Electrically conductive

Applicable to lightweight alloys + complex geometries
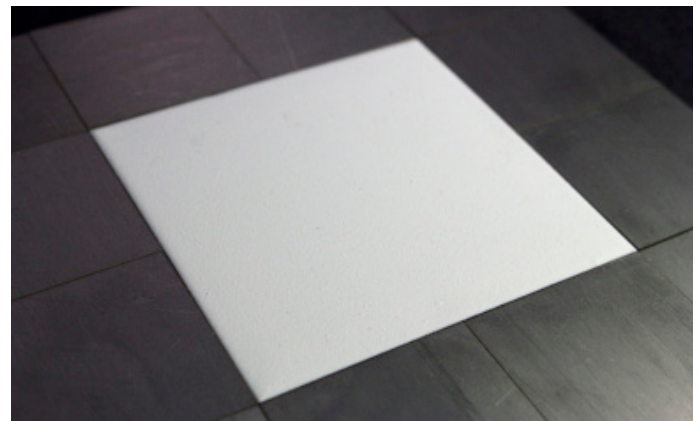
Extremely robust to AIT activities

SolarWhite is ENBIO's inorganic, non-porous, white, thermo-optical coating with maximum reflectance. The absorptive and emissive values are extremely stable at high and low temperatures and under harsh radiation. The coating is also electrically conductive, robust when handled, and easily cleaned. This combination of strengths makes it stand out amongst white thermal control coatings.

The coating is applied using a room temperature spray process followed by a thermal curing stage. The coating is extremely well bonded to the substrate, and the lack of organic components makes the coating robust and the process clean. SolarWhite is suitable for titanium and aluminium. Complex geometries can be coated.

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Name	SolarWhite
Application	Thermo-optical
Key Properties	Highly reflective / emissive
Solar absorption α_s (0.2-2.5 µm)	0.18 (140 µm)
UV Absorbance α_{uv}	0.11
Visual absorbance α_{visual}	0.14
Normal thermal emittance ε_n (0.25-18 µm)	0.96 (140 µm)
Hemispherical thermal emittance ε_h	0.89 (140 µm)
Coating density (g/cm³)	≈ 1.9
Thickness (µm)	100-250
Substrates	Titanium, Aluminium, CFRP
Volume resistivity	200 MΩ cm^{-1}
Adhesion - Peel test	Scotch peel tape test (3M898 strength of 9 N/20 mm)
Adhesion - Pull test	Scotch pull tape test (3M899 strength of 17 N/20 mm)
Cleanability	MEIS, IPA, Acetone
Outgassing (ECSS 70-02C)	Pass
TML	0.57%
CVCM	0.01%
Vacuum thermal cycling (-180°C → + 180°C, in vacuum < 10^{-6} mbar)	Pass

SolarWhite reflectance

SolarWhite on titanium coupon