SolarBlack

Thermo-optical coating

ENBIO™

Overview

SolarBlack is a flat absorber thermo-optical coating for thermal control and stray light suppression applications. It has been qualified and used by the European Space Agency on Solar Orbiter on the titanium heat-shield and high-gain antenna and numerous other components. It has also been emplyed on ExoMars, MeteoSat and JUICE platforms. SolarBlack is applied using a proprietary process called CoBlast. The CoBlast process is:

- Dry, room temperature and pressure using only compressed air
- Line-of sight for selective area treatment
- REACH compliant
- Robust to AIT activities
- Applicable to thin foils (18 µm) and thick plates > 1mm
- Excellent edge-retention (25 µm curves tested)
- Almost totally diffuse in UV/Vis/NIR range

Property	Value
Thickness	2-5 µm
Density / Weight	3.2 g/cm^3 or 16 g/m^2
Typical Absorption (α_s) on Ti6Al4V	0.96
Typical Emissivity (ε) on Ti6Al4V	0.78
Adhesion (ECSS-Q-ST-70-13C)	Compatible (no change in optical properties)
Tested thermal range	-191°C to 700°C (under vacuum)
Outgassing (ECSS-Q-ST-70-20C)	CVCM: 0.001 (%) RML: 0.03 (%)
Surface Resistivity	< 1 kΩ/sq

Solar Orbiter Testing		BOT	EOT
UV (26000 Equivalent Sun Hours) VUV (19,500 Equivalent Sun Hours) Electron (234 hrs at 60 KeV and 0.5nA/cm^2) Proton (2.5 hrs at 60 KeV and 1 nA/cm^2)	Absorption (α_s)	0.96	0.96
	Emissivity (ε)	0.78	0.78
Thermal Endurance (960 hrs at 600°C) Hot (20 cycles between 40°C and 550°C) Cold (20 cycles between -196°C and 50°C)	Absorption (α_s)	0.96	0.96
	Emissivity (ε)	0.78	0.78
JUICE Testing		**BOT**	**EOT**
Proton Irradiation: 1hr at 60keV, 12.5 nA/cm² (2.8e14/cm²)	Absorption (α_s)	0.95	0.95
	Emissivity (ε)	0.77	0.77
Thermal shock: (8 cycles between -260°C and RT)	Absorption (α_s)	Ongoing	
	Emissivity (ε)		

What makes the SolarBlack coating unique, is its ability to be applied to a range of substrates without changing the materials or process parameters:

- Titanium Grade 2 and Grade 5 (Solar Orbiter)
- Beryllium (Solar Orbiter)
- Additive Manufactured Titanium Grade 5 (Solar Orbiter)
- Aluminium 2000, 5000, 6000 and 7000 series
- Magnesium
- Steel (stainless, mild)
- Copper
- Nickel and nickel plated aluminium

SolarBlack can also be applied to polymer materials such as MLI, PEEK and Ultem to provide a diffuse surface.

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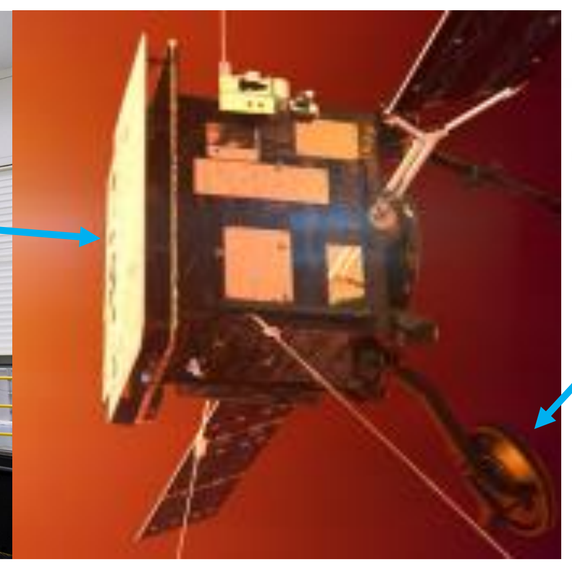

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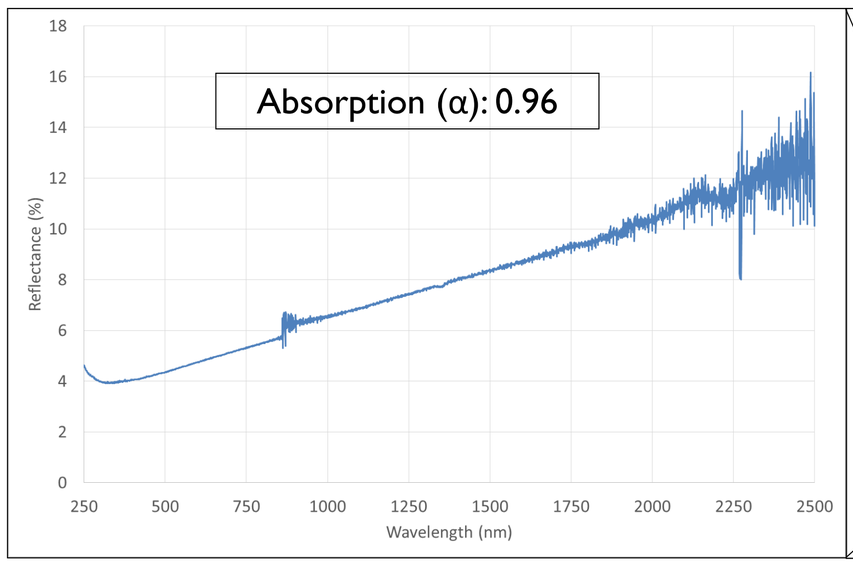

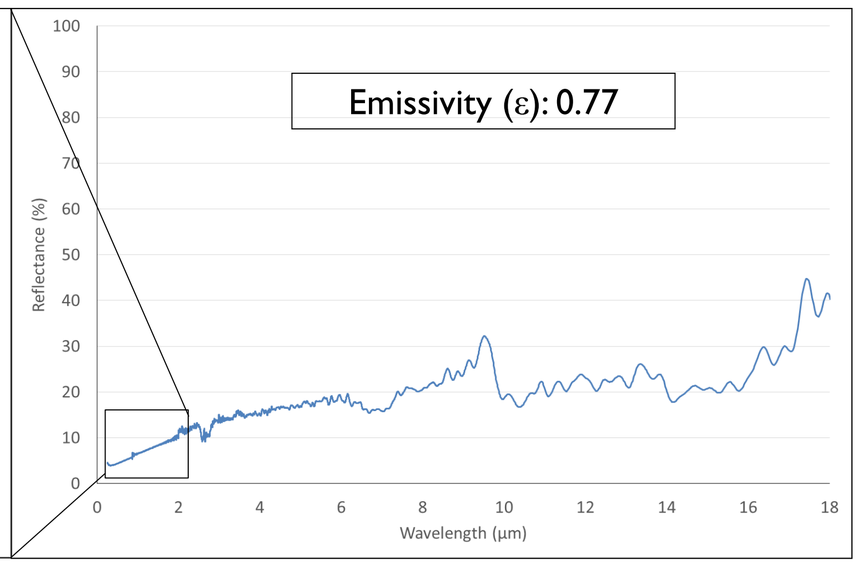

Interested in Trialling SolarBlack?

If you are interested in a trial, please contact us at info@enbio.eu with the following information:

- Substrate type and thickness
- Component geometry and area to be treated
- Operating requirements (thermo-optical properties, temperature range, etc.)

ENBIO Ltd. DCU Alpha Innovation Campus, Glasnevin, Dublin 11, D11 KXN4, Ireland. www.enbio.eu Tel: +353 1 5253305 Email: info@enbio.eu