THE QUALIFICATION OF ENBIO SOLAR WHITE THERMAL CONTROL COATING WITH ITO COATING AND IT USE ON THE SOLAR ORBITER PROJECT.

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ABSTRACT

The Solar Orbiter mission to study the sun exposes the surfaces of the spacecraft to very high levels of UV radiation. The existing white coatings were either polymer based and so would suffer high levels of degradation or ceramic based with associated processing and handling problems. A white coating Solar White from Enbio ltd. was evaluated and was shown to be physically robust with the ability to clean the coating surface of contaminants by solvent wiping. Initial testing has shown it to have excellent thermo optical properties that were very stable in respect to UV radiation. A major drawback was the mission requirement for high level ESD performance that could not be achieved with the existing version of the Solar White coating. A version was therefore developed with an ITO coating on top of the Solar White coating that provided the necessary ESD performance with only a small degradation in the thermo optical properties.

This paper describes the testing carried out to develop and qualify the coating on both aluminium and Ti substrates for a number of components to be used on the outside of the Solar Orbiter spacecraft.