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MATERIALS AND STRUCTURES SYMPOSIUM (C2)
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NEW PLASMA SPRAYED CERAMIC COATINGS TECHNIQUES. APPLICATION TO SPACE.

Abstract

The purpose of this paper is to present on one hand the applicability of fiber-reinforced Ultra High Temperature Ceramics (UHTC) and UHTC coated metals to space missions and on the other hand the plasma sprayed ceramic coating technique on refractory metals for space applications. CIRA has designed two UHTC winglets that shall be installed on the Australian rocket SCRAMSPACE. The paper describes the new material selected for this experiment, a fiber reinforced UHTC, and a new technology of UHTC coating. The present paper presents as well, an application of ceramic coatings technique in the field of aerospace hypersonic vehicles, where the high thermal loads are coupled with highly reactive plasma environment. The results of a material selection campaign conducted by CSM and CIRA is presented. A set of substrates, coatings and deposition techniques has been individuated as possible candidates for a real flight test. Many samples have been realized and tested. A first selection was based on pull test, the final selection was accomplished by means of plasma torch test, exposing conical samples to very high temperatures. The result is at the selection of a substrate /coating system that shall be used in future real flight applications.