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OXIDATION-RESISTANT POLYMERS PREPARED BY PLASMA IMMERSION ION IMPLANTATION.

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Low energy metal plasma immersion ion implantation has been used to modify the surface of high performance polymers such as Kapton HN, Kapton CB, (Kapton Black), clear and metallized Kapton E, Mylar, PEEK and Lexan, in the form of thin films, in order to enhance their oxidation resistance in highly aggressive oxidative environments. A filtered cathodic arc plasma source was used to produce a low energy Al ion stream, which was accelerated towards the substrate in an oxygen background by further application of a pulsed bias voltage. The co-implantation of Al and O resulted in great enhancement in oxidation and erosion resistance in very active oxidative environments such as oxygen plasmas and fast (2-3 eV) atomic oxygen beam. Superior performance in such environments is particularly important for space applications, but may be useful also in many terrestrial applications. The impact of the retained dose and implantation conditions on erosion and oxidation resistance, as well as optical and thermal-optical properties, such as light transmittance in the visual, solar absorptance and thermal emittance are analyzed and discussed. It is shown, that by choice of implantation conditions and treatment time those properties of the mentioned above polymers may be left practically unchanged or altered in various ways.

Conference Topic: 1 or 3

Poster or Oral? Oral

Publication is intended? Yes

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