OPTIMIZED PLASMA ENHANCED CHEMICAL VAPOR DEPOSITION FROM HMDSO/O2 FOR SURFACE PROTECTION OF METALS

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Abstract

The coatings were obtained from mixtures of hexamethyldisiloxane (HMDSO) with oxygen using a radio frequency capacitively coupled glow discharge at 13.56 MHz. Deposition of SiO2-like films from 8% HMDSO/O2 were found to have low internal stress, high fracture toughness and high hardness. Different pressures were used in order to obtain the best properties of the films. These dual purpose films can be used as a transparent protective coatings for aluminum substrates or an intermediate layer for harder coatings with good adhesion on stainless steel. The films were optically characterized by spectroscopic ellipsometry and reflectometry. Complete atomic composition was determined by ion beam analysis (RBS/ERDA). Infrared spectroscopy was used for the chemical bonds assessment. Hardness, elastic modulus and scratch test were performed. Surface energy measurements indicated hydrophilic character of the coatings, an important factor for industrial applications. This work was supported by the Czech Ministry of Education, under project MSM 0021622411 the Grant Agency of Czech Republic project GACR 104/09/H080.

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