Biodegradable polymer properties through ceramic coatings

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Abstract. Coating of bio-based polymers with ceramic layer has attracted interest recently, the research topic raising difficulties regarding the technology of obtaining layers that involve very high working temperatures. The study aims to analyses the mechanical, tribological and structural characteristics of the Arboblend V2 Nature biodegradable polymer after the deposition of ceramic microlayers. The micro powders used were Amdry 6420 (Cr2O3), Metco 143 (ZrO2 18TiO2 10Y2O3) and Metco 136F (Cr2O3-xSiO2-yTiO2). The coated samples were obtained by injection molding and the deposition was achieved by using Atmospheric Plasma Spray (APS) method. The results of the related analyses showed that, in general, the deposits of ceramic micro particles increased the material surface characteristics (hardness, scratch resistance, apparent friction coefficient), due to the uniformity of the ceramic coating on the polymeric substrate. Based on these, it was possible to recommend the use of coated bio-based polymer - Arboblend V2 Nature in harsh operating conditions, such as the automotive industry.

Keywords: lignin-based polymer, coating, micro powders, wear, adhesion

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