

Nanocharacterization of PIII Treated 7075 Aluminum Alloy

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Abstract : Nitrogen implantation in aluminum and its alloys is acquainted for the difficulties in obtaining modified layers deeper than 200 nm. The present work addresses a new method to overcome such a problem; although, the coating with nitrogen and oxygen obtained by plasma immersion ion implantation (PIII) into a 7075 aluminum alloy surface was too shallow. This alloy is commonly used for structural parts in aerospace applications. Such a layer was characterized by secondary ion mass spectroscopy, electron microscopy, and nanoindentation experiments reciprocating wear tests. From the results, one can assume that the wear of this aluminum alloy starts presenting severe abrasive wear followed by an additional adhesive mechanism. PIII produced a slight difference, as shown in all characterizations carried out in this work. The results shown here can be used as the scientific basis for further nitrogen PIII experiments in aluminum alloys which have the goal to produce thicker modified layers or to improve their surface properties.

Keywords : aluminum alloys, plasma immersion ion implantation, tribological properties, hardness, nanofatigue

Conference Title : ICAMAME 2017 : International Conference on Aerospace, Mechanical, Automotive and Materials Engineering

Conference Location : Rome, Italy

Conference Dates : March 05-06, 2017