

Experimental Study and Characterization of DLC Films on steel, using PECVD-DC pulsed with Additional Cathode

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Nowadays, surface engineering it has required tools of industrial use with enhanced surface properties that is, high hardness, resistance against corrosion, resistance against wear, etc. DLC coatings are suitable for resolving these requirements. Then, in this work it is reported the experimental study and characterization of DLC films on Stainless Steel (SS) using a pulsed-DC PECVD with additional cathode. As part of this study, response of total current on change of voltage and pressure were analyzed, also. After pulsed-DC PECVD treatment, the DLC coating on SS surface were characterized. Raman spectroscopy was used to estimate the atomic arrangements, the hydrogen content and as well as to determining the quality of films on substrates. The hardness of the films was measured by the nanoindentation technique, the film thickness and morphology was determined by Scanning Electron Microscopy. The friction coefficient was determined by the ball on disk technique. The adhesion of the films was determined by the standard VDI3198 type using Rockwell C indentation with a load of 150 kg. Our result has shown a thick DLC film of about 3.2 μm . As a result the hardness and the tribological properties (friction coefficient) were enhanced in 60% and 65%, respectively.

References

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