

Influence of TiW interlayer in DLC film adhesion onto AISI H13

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Diamond-like carbon (DLC) films have attracted attention in the last years because of their properties. Nevertheless, the DLC coatings do not have good adherence on metallic substrates as steels. The most common process is to place a silicon interlayer between the substrate and the DLC film. In this work an alloy of TiW was used as interlayer in order to improve adhesion of the DLC films onto AISI H13 substrates. The influence of the interlayer thickness was studied, using 100, 200, and 300 nm. The TiW interlayers were deposited via R.F. magnetron sputtering, while the DLC coatings using a modified pulsed-DC PECVD system with an additional cathode. Interlayer crystal structure was determined by X-ray diffraction (XRD), finding a cubic structure. Interlayer and DLC's surface morphology was observed using a High Resolution Field Emission SEM (TESCAN with software MIRA3). Raman spectroscopy allowed to determinate the quality of the DLC films. Hydrogen content was calculated (20-30%) by slope of photoluminescence background was calculated too. Scratch test was employed to calculate the critical load using a Rockwell C indenter showing a better adhesion compared with the AISI H13.