

Diamond-Like Carbon Coatings for Friction Units

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It is known that diamond-like carbon (DLC) coating can be used effectively as a solid lubricator, which is characterized by low coefficient of friction and low wear.

We have developed and successfully used a new high-productive combined physical and chemical method of obtaining of the coatings (PVD-CVD method). This method provides a high deposition rate and doesn't require the using of bias voltage, which is important for the dielectric DLC coatings condensed on a conductive and non-conductive substrate.

Raman Spectroscopy and X-Ray Photo Electron Spectroscopy researches allowed to determine the ratio of sp^2 and sp^3 bonds of carbon atoms. Increase in the acetylenes pressure in vacuum chamber leads to enhance of amount of the sp^2 bonding and as a result to diminution of coefficient of dry friction up to 0.08.

It was shown some examples of using PVD-CVD method in the development of technologies of wear-resistant coatings obtaining on WC-Co micro-drills and cutters for PCB proceeding, renovation of punch plungers in high-pressure pumps, obtaining of lapping coating for the pistons of Diesel engines, passivation and hardening of the surface of molds for the plastics industry, obtaining of absorbing coatings for the body parts of space apparatus photodetectors, protective and decorative coatings for watches etc.

It was discussed the experience in cooperation with international organizations in this area accordingly to their demands, in particularly with the Korean Institute of Industrial Technology (impulse plasma source and DLC film technology delivering) and LG Corporation (DLC coatings for friction parts of high-side shell scroll compressor).