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NANOCOMPOSITES ON THE BASIS OF NEW SUPERHARD CARBON POLYMER

Abstract

Method of impulse plasma, ion-assisted deposition carbon polymeric coatings in the form of one-dimensional nanotube with monocrystalline structure and nanocomposites on their basis are received. The effect is used as basis for the developed technology of carbon polymeric coatings deposition with controlled properties. The atom structure of coatings is studied by a method of appearing through electronic microscopy. The picture of electronic diffraction of monocrystalline carbon is absolutely distinct from pictures of diffraction of all known forms of carbon. The lead volumetric modeling and detailed experimental research of physical and chemical properties of carbon polymeric coatings with the one-dimensional highly oriented structure, has allowed us to recreate existing model of a new carbon material. On the basis of the received result typical models of synthesis nanostructural carbon coatings possessing high tribological properties (optimum wear resistance, low factor of friction, etc.) have been proved. The experimental researches executed by us were confirmed early with obtained data, that new carbon coatings with monocrystalline structure and nanocomposites on their basis provide reduction of factor of friction and high wear resistance in tribological unit in comparison with similar units of friction without a coating or coated traditional diamond-like films on the basis of carbon with amorphous structure [1, 2]. The experiments show that obtained nanocomposites the material on the basis of carbon polymer with monocrystalline structure on a surface of the tempered steel in pair with a firm alloy has low enough factor of friction poorly changing in a wide range of loadings. The high pressures developed in contact of pair of friction, have not led to occurrence of defects of a coating that speaks about its high bearing ability and wear resistance. The received coatings keep antifrictional effect even in severe constraints of dry friction.

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References 1. V.A. Levchenko, I.A. Buyanovsky, Z.V. Ignatieva, V.N. Matveenko. Effect of Coatings-Orientants on Antifriction Properties of Lubricants in Tribounits under Boundary Lubrication. //Journal of ASTM International, 2006,3,N5 p.78-85 2. V.A. Levchenko, V.N. Matveenko, A.N. Abramov, D.G. Tjulenev, A.V. Majstrenko, V.J. Sholom, I.A. Buyanovsky, Z.V. Ignatieva. Application of coatings-orientants for increase of working capacity of the cutting tool. J. of a friction and greasing in cars and mechanisms, 7, 2008, pp. 40-44.