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Carbon polymer-New promising material for medical application

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Method of impulse plasma ion-assisted deposition of new polymeric carbon coatings in the form of one-dimensional nanotube with monocrystalline structure is received. The effect is used as basis for the developed nanotechnology of polymeric carbon coatings deposition with control properties. The developed coating represents new allotropic structure of carbon which contains homeotropical alignment the atoms of carbon in the form (Patent of the Russian Federation 2282583). There are no analogues to these synthesized biological coatings.

Carbon polymer adheres to most substrates, including stainless steel, glass, polymers, and silicone rubber. Adhesion is higher than substrate strength. In mechanical tests on silicone rubber, including elongation of 400 per cent and multiple deformations, the coating withstood the test without visible damage. Neither crack nor exfoliation could be seen. In adhesion tests, the new material was removed only with parts of the substrate material, so its adhesion to most substrates is higher than the strength of the substrate. Among its most prospective medical applications are cardiovascular devices, orthopedics and dental implants, contact lenses, intraocular lenses, soft tissue implants, surgical needles.

Before existing coatings of implants, the offered medical carbon polymer coating has following differences and advantages:

- The coating possesses absolute biocompatibility
- From soft tissues round an offered material is formed capsule
- Presence at a medical coating of floating porous structure (a living tissue arranged under fibers'), stimulates growing into it of a bone fabric and formation of the strong block, that in the literature has received the name of "biological fixing"
- From living tissues cellular reaction to a material is absent

Biography

Vladimir A Levchenko has completed his PhD at the age of 27 years from Mechnikov Odessa State University and postdoctoral studies from Lomonosov Moscow State University. He is Leading Researcher of Lomonosov Moscow State University and the Director of Nanotribology Center LMSU, BIES RAS (Lomonosov Moscow State University, Blagonravov Institute of Engineering Science, Russian Academy of Sciences). He has published more than 210 papers in reputed journals and serving as an editorial board member of repute. He is author of more than 20 inventions in different spheres (medicine, machine engineering and energetic).

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