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Medical application of Diamond Like Carbon (DLC) coating: A review

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Artificial heart forms a specific intervention that can be used for treating various heart diseases. Silicon oil is used as a pillar for the artificial heart. However, certain problems may arise with the silicon oil ions as they diffuse with the blood through ion penetration. There are seven various forms of Diamond Like Carbon (DLC). All forms have a high value of sp³ hybridized carbon atoms. DLC can be found in more than one type primarily because the diamond is produced in two different crystalline poly-types. DLC coatings exhibit great combination chemical, mechanical and electrical properties. As compared to the conventional hard coatings, they can be produced at very low temperatures without compromising its hardness. The study examined use of micro-hardness tester, the AFM and the DLC films deposited because of R.F. plasma discharge. It is apparent that the roughness and hardness of films depend upon the bias voltage provided to the substrates and upon the pressure exerted on the deposition chamber. Artificial hearts contain power adapter, blood type diaphragm, two oval pumps and multiple electronic modules. The power adapter plays an important role in delivering hydraulic silicone oil into the blood as it is pumped through a pair of oil channels. The rotating pulse of silicone oil makes circulation more flexible. Use of planar electrodes form the most popular method of operation while the RF plasma are used. It therefore, is not easy to uniformly deposit the DLC film upon the surfaces of insulator material especially when a three-dimensional shape is used. DLC films are used for coating ellipsoidal diaphragm (polyurethane elastomer) and yet forms an influential biomaterial for functioning of the artificial hearts. Such coatings are done to prevent penetration of the hydraulic silicone oil to blood through the diaphragm.

Biography

Ali S Alanazi has an extensive background in Biomedical engineering in Saudi Arabia and Japan, as a researcher, trainer and organizer of biomedical engineering programs implementation.

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