

Haemocompatibility of Surface Modified AISI 316L Austenitic Stainless Steel Tested in Artificial Plasma

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Abstract : The study comprises evaluation of suitability of passive layer created on the surface of AISI 316L stainless steel for products that are intended to have contact with blood. For that purpose, prior to and after chemical passivation, samples were subject to 7 day exposure in artificial plasma at the temperature of $T=37^{\circ}\text{C}$. Next, tests of metallic ions infiltration from the surface to the solution were performed. The tests were performed with application of spectrometer JY 2000, by Yobin - Yvon, employing Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES). In order to characterize physical and chemical features of electrochemical processes taking place during exposure of samples to artificial plasma, tests with application of electrochemical impedance spectroscopy were suggested. The tests were performed with application of measuring unit equipped with potentiostat PGSTAT 302n with an attachment for impedance tests FRA2. Measurements were made in the environment simulating human blood at the temperature of $T=37^{\circ}\text{C}$. Performed tests proved that application of chemical passivation process for AISI 316L stainless steel used for production of goods intended to have contact with blood is well-grounded and useful in order to improve safety of their usage.

Keywords : AISI 316L stainless steel, chemical passivation, artificial plasma, ions infiltration, EIS

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