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论文

钝化处理对316L不锈钢血液相容性的影响

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摘要： 通过血小板黏附和蛋白吸附研究了硝酸钝化(NT)和柠檬酸钝化(CT)对316L不锈钢血液相容性的影响, 并通过XPS分析、接触角和表面电荷测量,研究了经两种方法钝化的316L不锈钢表面钝化层成分、表面张力及表面电荷等表面性能对血小板黏附和蛋白吸附的影响. 研究结果表明, 柠檬酸钝化后的316L不锈钢表现出相对较好的血液相容性, 这与316L不锈钢经柠檬酸钝化后较高的表面张力和相对较低的表面正电荷等表面性能有关. 同时研究表明,316L不锈钢表面白蛋白的吸附量与表面张力的极性分量成线性关系,而纤维蛋白原吸附量与表面电荷密度呈线性关系.

关键词： 316L不锈钢 钝化 血小板黏附 蛋白吸附 表面张力 表面电荷

THE EFFECT OF PASSIVATION ON THE HAEMOCOMPATIBILITY OF 316L STAINLESS STEEL

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Abstract: The difference of haemocompatibility of medical 316L stainless steel passivated by nitric acid (NT) and citric acid (CT) was studied. Platelet adhesion and protein adsorption were studied to evaluate the haemocompatibility of the 316L stainless steel passivated by the two different methods. XPS analysis, water contact angle and surface charge measurement were used to analyze the surface properties of the steel such as chemical composition and depth distribution of the main elements in passivated films, surface energy and surface charge. The results showed that the 316L steel passivated by citric acid displayed better haemocompatibility, which could be related to the higher surface energy and relatively lower surface charge. The results also showed that the polar component of surface energy was of linear relation with the albumin adsorption on 316L stainless steel while the surface charge had the same relation with fibrinogen adsorption.

Keywords: 316L stainless steel passivation platelet adhesion protein adsorption surface energy surface charge

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