

BLOOD COMPATIBILITY OF Ta₅₊ DOPED TiO₂ FILM SYNTHESIZED BY SPUTTERING DEPOSITION

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The magnetron sputtering was adopted to synthesize Ta₅₊ doped titanium dioxide film on titanium matrix. The rutile structure was obtained. The blood compatibility of the film was studied in vitro by clotting time measurement, platelet adhesion measurement, thrombin time and protein adsorption tests. In vivo experiment further performed by implant Ta₅₊ doped TiO₂ samples and LTIC into right atrium of the dogs heart. The results in vitro showed that the platelet adhesion on Ta₅₊ doped TiO₂ film surface was significantly decreased by about 2 orders of that on LTIC and protein adhesion was decreased by 1 order of that on LTIC. Compared to LTIC, TT of doped film was long. It was found that after samples implanted into dog's heart 17 days, there were a lot of blood cells and fibre-shaped things adhered on LTIC surface, and these blood cells and platelets had been deformed, so volume structure thrombus was formed and piled up on the LTIC surface, but there was no thrombus on Ta₅₊ doped TiO₂ film surface. The results reveal that the blood compatibility of Ta₅₊ doped TiO₂ film is much better than that of LTIC which was once considered as the best biocompatible material for artificial heart valve. In addition, blood compatibility mechanism is discussed, and it is considered that semiconductivity of the Ta₅₊ doped TiO₂ material might be a significant factor to affect the blood compatibility.