

**Enhancement of Hemocompatibility on Titanium
Implant with Titanium-Doped Diamond-Like Carbon
Film Evaluated by Cellular Reactions Using Bone
Marrow Cell Cultures in Vitro**

歐耿良

Feng WC;Wang CH;Chiou SY;Chen CS;Ou KL

Abstract

The purpose of this study is to evaluate a new method to deposit a-C:H film with the biological acceptance of titanium as a protective coating material in biomedical applications. For this purpose, various amounts of titanium were incorporated into a-C:H films by a combined radio frequency and magnetron sputtering system. In order to realize the properties of a-C:H films with and without Ti, the specimens were evaluated by material analyses and cell culture. The Ti and TiC were embedded in and connected to an amorphous a-C:H matrix. The a-C:H/Ti film has better capability of osteoblast differentiation than Ti and a-C:H, revealing that the biocompatibility of a-C:H containing Ti is obviously better than a-C:H. It is believed that the Ti plays an important role in enhancing the film's adhesion and biocompatibility. Furthermore, it also revealed the issue of hemocompatibility and that blood/a-C:H/Ti interactions as a function of surface roughness can affect the red blood cell (RBC) distributions in early tissue healing. The different surface roughness can result in various blood cell responses as investigated by RBC distribution and platelet aggregation. ©2009 American Vacuum Society