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Application of electrical discharge coating to TiNi alloys surface treatment

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Ti-Ni shape memory alloys (SMAs) have been commonly used in mechanical, aerospace, military applications, and biomedical engineering. In biomedical field, TiNi SMAs are served as orthodontic arch wires, surgical stents, maxillofacial implants, and bone plates because of their unique superelasticity, superior shape memory effect, excellent corrosion resistance and, low elastic modulus. Nevertheless, a disadvantage is that Ni may cause allergy for a long-term implantation in human body. It has been found that corrosion resistance of TiNi SMAs is improved by coating a titanium nitride or carbide film the alloy surfaces. This study modified the surface of the Ti-Ni SMAs by electrical discharge coating technology. Gas was chosen as the dielectric PSMid to improve process efficiency and decrease environmental pollution. The modified surface comprised titanium carbide and nitride which exhibited high hardness but compromised SMAs' shape memory recovery.

Biography

Shih-Fu Ou obtained his PhD degree in 2011 from National Taiwan University for research the anodic oxidation of titanium alloys applied in biomedical implants. Since 2013, he is Assistant Professor of department of mold and dies in National Kaohsiung University of applied sciences. His current research is divided into three parts. The first is focused on bio-ceramic and surface modification of titanium alloys applied as implants.

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