EXPERIMENTAL STUDY THE EFFECTS OF TITANIUM NITRIDE (TiN) ION IMPLANTATION AND HYDROXYAPATITE (HAp) COATING TO FATIGUE LIFE OF STAINLESS STEEL AISI 316L AS BIOMATERIALS

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ABSTRACT
Stainless steel AISI 316L is widely used for the purpose of implantation in orthopedic surgery. However, another problem that arises in stainless steel AISI 316L implant material can not be used for a long time because in the environmental of body fluid the local corrosion occurs and some ions released into the tissues around the implant.

In this study, material AISI 316L stainless steel will ion implanted of Titanium Nitride (TiN) with variation of implantation time 60, 90, and 120 minutes to produce the longest fatigue life. Coating of hydroxyapatite (HAp) using Electrophoretic Deposition (EPD). To know the effect of surface treatment to fatigue life of AISI 316L stainless steel, rotating bending fatigue test will be carried out with load variation of 420 MPa, 440 MPa and 460 MPa.

The test result showed increased surface hardness with increasing time of implantation. Time of implantation to produce the highest increase in fatigue life is 90 minutes. Ion implantation of TiN increases fatigue life of substrate material. There are some difficulties in the process of Hydroxyapatite coating because of the specimen has a smooth surface, so the estimation is HAp coating give no effect to the fatigue life of material ion implantation.

Key words: TiN ion implantation; Hap; EPD; fatigue test.
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