INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

Name of the Student	:	RASMI RANJAN BEHERA
Roll Number	:	126103003
Programme of Study	:	Ph.D.

Thesis Title: BIOCERAMIC COATING ON Ti ALLOY USING MAGNETRON SPUTTERING FOR ORTHOPEDIC APPLICATIONS

Name of Thesis Supervisor(s)	:	Dr. M. RAVI SANKAR
Thesis Submitted to the Department/ Center	:	MECHANICAL ENGINEERING
Date of completion of Thesis Viva-Voce Exam	:	10TH JUNE 2019
Key words for description of Thesis Work	:	BCP COATING, BCP-TIO_2, RF SPUTTERING, TEXTURING, BIOCOMPATIBILITY, PROTEIN ADSORPTION, BIOACTIVITY

SHORT ABSTRACT

In the present study, bio-ceramic material like biphasic calcium phosphate (BCP), hybrid BCP-TiO_2 were deposited on the surface of bare as well as textured Ti-6Al-4V substrates using RF magnetron sputtering. BCP films were deposited on Ti-6Al-4V at a particular set of sputtering parameters with varying the sputtering time of 4 h, 6 h and 8 h and characterized. The TiO_2-BCP hybrid coating with 25% and 50% TiO_2 were fabricated and investigated for different mechanical and biological properties. In addition, the BCP film was deposited on textured substrates fabricated by laser surface texturing. Different characterizations such as surface morphology, elemental analysis, phase composition, surface roughness and wettability of the substrates were studied. Adhesion of the films was carried out using scratch test. Different biological studies like protein adsorption, bioactivity, cell adhesion and proliferation were investigated. It can be concluded that RF magnetron sputtering is a better technique for deposition of CaP bio-ceramic on Ti-6Al-4V implant. TiO_2 addition in BCP film enhances the biological performance as well as adhesion behavior of implant compared to BCP film; hence, it can be a good choice for the long-term application of orthopedic and dental implants. In addition, surface texturing on Ti-6Al-4V with 1-2 µm roughness followed by BCP film deposition is a better option for the orthopedic as well as dental applications.