Contribution ID: **23** Type: **Poster**

Fabrication and Physical Properties of Titanium Nitride/Hydroxyapatite Composite on Polyether Ether Ketone by RF Magnetron Sputtering Technique

Wednesday 24 May 2017 15:45 (15 minutes)

Titanium nitride coatings have been used very successfully in a variety of applications because of their excellent properties, such as the high hardness meaning good wear resistance and also used for covering medical implants. Hydroxyapatite is a bioactive ceramic that contributes to the restoration of bone tissue, which together with titanium nitride may contribute to obtaining a superior composite in terms of mechanical and bone tissue interaction matters.
This paper aim to optimize deposition conditions for films synthesis on PEEK by varying sputtering parameters such as nitrogen flow rate and direction, deposition time, d-s (target-to-substrate distance) and 13.56 MHz RF power. The plasma conditions used to deposit films were monitored by the optical emission spectroscopy (OES). Titanium nitride/Hydroxyapatite composite films were performed by gas mixture with nitrogen and argon ratio of 1:3 and target-to-substrate distance at 8 cm. The gold color, as-deposited film was found on PEEK with high hardness and higher surface energy than uncoated PEEK.

Keyword: Titanium Nitride, Hydroxyapatite, RF magnetron sputtering, Polyether ether ketone

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Session Classification: Poster Presentation I

Track Classification: Plasma and Ion Physics, Nuclear and Radiation Physics