National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Development of Sodium Alginate-Titanium Dioxide Composite Coating on AZ31B Magnesium Alloy to Improve Corrosion Resistance and Bioactivity
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Venue	: BM Department Seminar Room
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Abstract	: Magnesium alloys have emerged as a promising biomaterial for orthopaedic implants. Problems like stress shielding effect which is common in hard metal implants such as stainless steel or titanium can also be reduced by the use of magnesium implants. Higher corrosion rate is still a challenge that needs to be overcome in magnesium implants for biomedical applications. Therefore, to encounter this problem protective layer of polymer coating including Sodium Alginate and Titanium dioxide has been used to reduce the rate of degradation in magnesium implants for their effective use in biomedical applications. AZ31B was chosen as an effect magnesium alloy to be used in this study. Electrophoretic Deposition was used to deposit the polymers onto the surface. The physiochemical properties of the coated AZ31B samples were analyzed using a range of characterization techniques, including SEM, XRD and Contact Angle. A dense crack-free microstructure was seen in SEM. XRD analysis further confirmed the successful incorporation of Sodium Alginate and TiO2. The desirable hydrophilic nature of the coated samples was observed in contact angle study. The electrochemical tests conducted showed that the sample coated with both Sodium Alginate and TiO2 had the least corrosion rate and was most effective in order to control the rate of degradation. The study demonstrates that Sodium Alginate and TiO2 composite coating show significant promise for orthopaedic applications. The findings suggest that with careful optimization, it is possible to develop coatings that are both durable, biocompatible and offer improved corrosion resistance. Keywords: Magnesium implants, AZ31B alloy, Titanium Dioxide, Sodium Alginate, Electrophoretic deposition, Corrosion resistance. ALL ARE CORDIALLY INVITED