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Enhanced corrosion resistance of strontium hydroxyapatite coating on electron beam treated surgical grade stainless steel

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ABSTRACT

The surface of 316L stainless steel (316L SS) is irradiated by high energy low current DC electron beam (HELCDEB) with energy of 500 keV and beam current of 1.5 mA followed by the electrodeposition of strontium hydroxyapatite (Sr-HAp) to enhance its corrosion resistance in physiological fluid. The coatings were characterised by X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR) and High resolution scanning electron microscopy (HRSEM). The Sr-HAp coating on HELCDEB treated 316L SS exhibits micro-flower structure. Electrochemical results show that the Sr-HAp coating on HELCDEB treated 316L SS possesses maximum corrosion resistance in Ringer's solution.

Keywords: 316L stainless steel, High energy low current DC electron beam (HELCDEB), Surface treatment, SEM, Polarisation, EIS.