ANISOTROPIC A-Fe2O3/CHITOSAN NANOCOMPOSITES BY ELECTROPHORETIC DEPOSITION

Laura Ramos Rivera, Institute of Biomaterials, FAU Erlangen-Nuremberg
Email laura.ramos@fau.de
Monica Distaso, Institute of Particle Technology, FAU Erlangen-Nuremberg
Aldo R. Boccaccini, Institute of Biomaterials, FAU Erlangen-Nuremberg

Key Words: Hematite, coatings, chitosan, electrophoretic deposition

Electrophoretic deposition (EPD) has been developed for the fabrication of composite coatings based on anisotropic hematite particles (α-Fe2O3) and chitosan (CHT) on stainless steel substrates for different technological applications ranging from coatings to sensors. The particles have been synthesized under refluxing conditions starting from a solution of FeCl2 4H2O and Poly-N-vinyl-pyrrolidone (PVP) in N, N-Dimethylformamide (DMF). A residual polymer content of around 10 percent by weight was found as part of the structure after the synthesis. Voltage 25 and deposition time of 5 min were selected as best deposition conditions which imply high homogeneous surface, non-delamination and good distribution of α-Fe2O3 particles. X-ray diffraction (XRD) measurements show the presence of hematite phase (α-Fe2O3). Thermogravimetric analysis (TGA) measurements were carried out to find the content of α-Fe2O3 and chitosan in the final coatings. According to this measurement, 60 and 35 percent were the final content. Scanning Electron Microscopy (SEM) images revealed the microstructure of the composite where it is possible to observe the deposition of anisotropic particles across the coating and cracks around them.