

INFLUENCE OF PARTICLE SIZE AND CRYSTALLITE SIZE ON HYDROXYAPATITE NANOPARTICLE DEGRADATION IN PBS

J.Y. Anjana, D.H.R. Arachchi, and S.U. Adikary*

Department of Materials Science and Engineering, University of Moratuwa, Sri Lanka

**Email: suadi@uom.lk*

In this study, we investigate the influence of particle size and crystallite size of Hydroxyapatite nanoparticles, synthesized using the wet chemical precipitation technique on degradation in Phosphate Buffer Saline (PBS). Different concentrations of calcium hydroxide and orthophosphoric acid were used for the synthesis process to achieve different supersaturations. The Ca/P molar ratio was kept at 1.67 while changing the supersaturation. The synthesized nanoparticles were characterized using a laser particle analyzer, Scanning Electron Microscope (SEM), X-ray diffractometer (XRD), Energy Dispersive X-Ray Analysis (EDAX), and Fourier- Transform infrared (FT-IR) spectroscopy to study their size, morphology, structure, and composition. The study demonstrated that controlling the precursor concentrations to induce varying supersaturation levels allows for the modulation of particle size and crystallite size of Hydroxyapatite nanoparticles, subsequently affecting the degradation behavior of HA, which is dependent on the particle size.

Keywords: Nano-Hydroxyapatite, Wet Chemical Synthesis, Supersaturation, Particle Size, Crystallite Size