

## ELECTROPHORETIC DEPOSITION OF HYDROXYAPATITE NANOPARTICLES FROM DIFFERENT ALCOHOLIC SUSPENSIONS: EFFECT OF TRIETHANOLAMINE

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The suspensions of HA nanoparticles in different alcohols (methanol, ethanol, isopropanol and butanol) were prepared and triethanolamine (TEA) was used as a dispersant. The results obtained for the conductivity of suspensions, zeta potential of particles, sedimentation of suspensions and FTIR analysis showed that protonated TEA ( $H^+TEA$ ) is adsorbed on the surface of HA nanoparticles. The adsorption of TEA on the HA nanoparticles is strong enough so that the degree of its protonation in the alcoholic suspensions determines its optimum concentration. TEA captures proton more easily from lower molecular weight alcohols; so at same TEA concentration there will be more  $H^+TEA$  in lower molecular weight alcohols leading to its smaller optimum concentration in them: methanol: 0.67mL/L, ethanol: 0.67mL/L, isopropanol: 4mL/L and butanol: 8mL/L. Electrophoretic deposition (EPD) was performed at 60V. The current density and in-situ kinetics of EPD were recorded. The  $f$  factor was calculated against TEA concentration.  $f$  factor decreased with TEA concentration in all alcoholic suspensions due to the increase in the electrochemical potential difference at the interface between deposit and suspension. At same TEA concentration, the  $f$  factor was smaller in low molecular size alcohols due to their lower viscosity leading to the faster detachment of particles in the interface. In contrast to isopropanolic and butanolic suspensions, the current density from methanolic and ethanolic suspensions containing TEA increased during EPD. If the resistivity of deposit is higher than the corresponding suspension (as usually is) the current density decreases and vice versa. It is concluded that the increase in current density during EPD from methanolic and ethanolic suspensions is due to the detachment of  $H^+TEA$  from the surface of HA nanoparticles as a result of applied electric field leading to the high concentration of free ions and so less resistivity of deposit relative to the corresponding suspension.