BIOMIMETIC SYNTHESIS OF PRECIPITATED CALCIUM CARBONATE/POLY(ETHYLENE GLYCOL) NANOCOMPOSITES USING DOLOMITE *VIA* CARBONATION ROUTE

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This Study describes a bio-mimetic laboratory-scale synthesis of precipitated calcium carbonate-poly(ethyleneglygol) (PCC-PEG) nanocomposites using readily and cheaply available impure dolomitic marbles and carbon dioxide gas. In order to separate calcium and magnesium contents, a method that we have devised already, that based on sucrose to solubilize CaO portion of the calcined dolomite while keeping other components in the solid state, was utilized. The calcium sucrate solution thus obtained was bubbled with carbon dioxide gas in counter current fashion in a purpose-built carbnation column. The materials obtained were characterized with several independent analytical techniques such as X-ray Diffraction (XRD), Fourier Transform Infrared (FTIR) spectroscopy, Scanning Electron Microscopy (SEM) and Atomic Absorption Spectrophotometry (AAS). Vaterite and calcite crystalline forms of calcium carbonate are found in final product. The synthesized PCC nanoparticles are of required purity and quality which can be used for industrial applications. The effects of initial concentration of PEG, pH of the solution, temperature etc. on the final yield of PCC-PEG were studied. Optimum conditions of 0.40 mol dm^{-3} of initial concentration of PEG, pH of 6.5, temperature of 80 °C gave the highest yield of PCC-PEG nanocomposite of 79.94%. The yields obtained in all other conditions are reasonably high and lie within 55% to 78%. As per industrial applications, usual laboratory conditions such as room temperature are preferred and under these conditions also impressive yields can be obtained. The magnesium impurity content is below 1% in all the samples.