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Green chemistry approach: Synthesis, morphological and thermal studies of nanocomposites of barium carbonate nanoparticles

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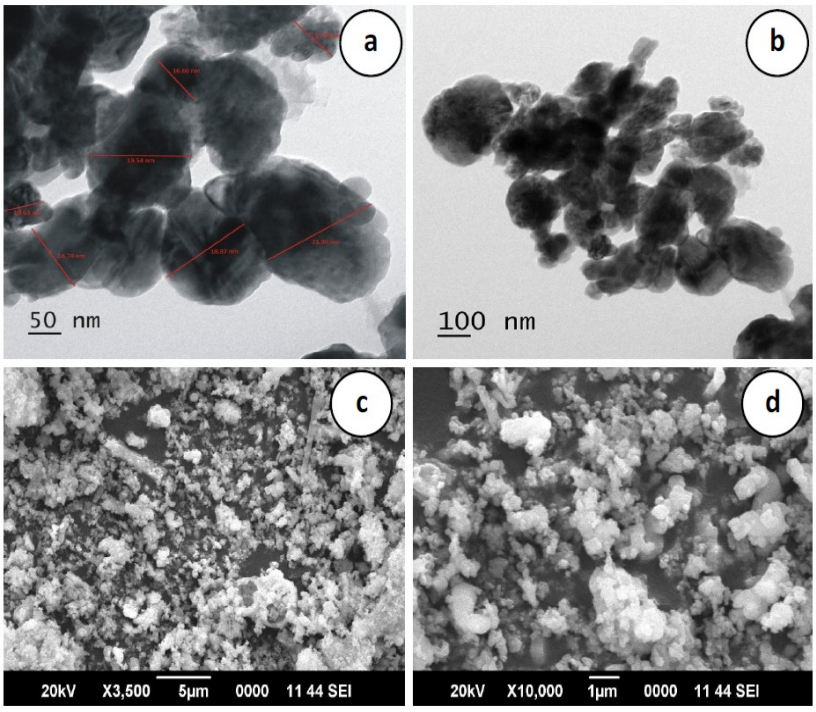

In the present study barium carbonate ($BaCO_3$) nanoparticles were synthesized by using barium chloride dihydrate, sodium hydroxide, urea and lemon juice as stabilizing agent. Thereafter, one polymer polymethyl methacrylate and three nanocomposites have been synthesized by using different concentrations (0.025, 0.050, 0.075 mg) of nanoparticles by adopting microwave assisted method. Nanoparticles were characterized by FT-IR, UV-Visible, X-Ray Diffraction, Transmission Electron Microscopic (TEM) and Scanning Electron Microscopic (SEM) studies. X-Ray diffraction peak broadening was used to evaluate the sizes of nanoparticles by using Debye-Scherrer equation. Nanocomposites were characterized by FT-IR, Scanning Electron Microscopic (SEM) studies. The thermal stability of polymer and nanocomposites was determined by TG/DTA. XRD studies and TEM images revealed average particle size of nanoparticles 17.09 nm. Thermal studies revealed that thermal stability of all nanocomposites has increased as compared to polymer.

Keywords: Nanoparticles, microwave assisted synthesis, FT-IR, P-XRD, Transmission Electron Microscope, Scanning Electron Microscope.