Title: **Electrochemical potential of chitosan nanoparticles obtained by the reverse micellar process**

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Abstract: Chitosan nanoparticles are synthesized by the reverse micellar technique using heptane as solvent and hexamine as surfactant. XRD, FTIR, and SEM/EDAX analyses are performed to investigate the structural and morphological behavior of chitosan nanoparticles. XRD shows the crystalline nature of the materials with peaks appeared at 2θ =17.8 °, 25.5 °, 31.2 °, 36.4 °, 44.7 °, and 48.5 °. The average crystallite size of obtained chitosan nanoparticles is 25 nm. The identification of functional groups in both pure chitosan and chitosan nanoparticles are compared using FTIR analysis. Noticed at wavenumbers 3435 cm^{-1} and 3460 cm^{-1} corresponds to the stretching vibration of the $–NH_2$ and –OH functional groups. SEM shows the uniform morphology of the materials and EDAX shows the presence of various elements (carbon, nitrogen, oxygen, aluminum and chlorine) in both the materials. The electrochemical behavior of the nanoparticles was analyzed by cyclic voltammetry analysis and galvanostatic charging/discharging. Electrochemical faradaic performance identifies chitosan nanoparticles as effective electrode materials in pseudo capacitors.

Keywords: Chitosan nanoparticles; Reverse micellar technique; XRD analysis; FTIR spectroscopy; SEM/EDAX characterization; Crystallite size; Electrochemical properties; Cyclic voltammetry; Galvanostatic charge–discharge; Pseudocapacitor electrodes

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