

Micelle encapsulation of ferromagnetic nanoparticles of iron carbide@iron oxide in chitosan

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Abstract

In this work, the synthesis and characterization of core@shell nanoparticles of Fe₃C/γ-Fe₂O₃ encapsulated into micelles of sodium dodecylsulfate and oleic acid stabilized with chitosan was developed. The nanoparticles were sonosynthesized at low intensities using iron pentacarbonyl (Fe(CO)₅) and oleic acid as iron source and hydrophobic stabilizer, respectively; obtaining a hydrodynamic diameter of 19.71 nm and PDI of 0.134. These nanoparticles were used as the organic phase during the production of a nanoemulsion with sodium dodecylsulfate and water. The final step, involved the stabilization of the nanoemulsion using low molecular weight chitosan solution at 2% in acetic acid by ultrasonication. The nanosystem showed a hydrodynamic diameter of 185.3 nm, a PDI of 0.150 with a superficial charge ζ of 36.7 mV. Due to these physical and chemical properties, it is believed that this type of nanoparticles can be use as theranostic agent.

3. “Effect of freeze-thawing conditions for preparation of chitosan-poly (vinyl alcohol) hydrogels and drug release studies”; Carbohydrate Polymers, 2018, 10.1016/J.CARBPOL.2018.05.00

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Biography:

Zavala-Rivera has completed his PhD at the age of 29 years from Cambridge University and postdoctoral studies from Universidad de Sonora. He is the Professor in Bionanoengineering in the Universidad de Sonora, one of the top universities in Mexico. He has published more than 17 papers in reputed journals in the areas of nanotechnology, biomateriales and bionanotechnology.

Speaker Publications:

1. “Photo-oxidative enhancement of polymeric molecular sieve membranes”; Nature Communications, 2013, 10.1038/NCOMMS2942
2. “Collective osmotic shock in ordered materials”; Nature Materials, 2012, 10.1038/NMAT3179