

POLY(VINYLLIDENE FLORIDE) NANOPARTICLES WITH SPIONS SYNTHESIZED BY MINIEMULSION METHOD

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The poly(vinylidene fluoride) (PVDF) exhibit due to its unique physical chemistry properties, such as excellent chemical resistance, thermal stability, high mechanical strength and high hydrophobicity. These properties allow their use as electrical and electronic devices [1, 2]. These properties are derived from the semi-crystalline structure that can be presented in different phases (α , β , γ and δ). The β phase exhibits largest spontaneous polarization due to high polarity difference in the crystalline structure showing ferroelectric, piezoelectric and pyroelectric properties more intense when compared with other phases [1, 3]. Superparamagnetic iron oxide nanoparticles (SPION) have great importance due to their properties such as superparamagnetism, biocompatibility, and nontoxicity. Nanoparticles were synthesized by inverse miniemulsion method using PVDF, N, N-Dimethylformamide, Tween80[®], dodecane, ammonium hydroxide (NH₄OH) and SPIONs (Fe₃O₄ synthesized by coprecipitation method). The obtained nanoparticles were washed by dialysis in distilled water for 7 days. The PVDF nanoparticles were characterized by SEM, which result in Spherical morphology with size less than 100 nm impregnated with 15 nm SPIONs. The combination of DSC, XRD, FTIR techniques indicates the predominance of β crystalline phase. Colloidal stability of PVDF nanoparticles was evaluated by DLS. The dispersion also remained stable for more than 7 days without variation in hydrodynamic diameter (165.4 nm). The analysis of Dh as a function of temperature (25 to 50°C) showed that the sample is not influenced the dispersion.

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