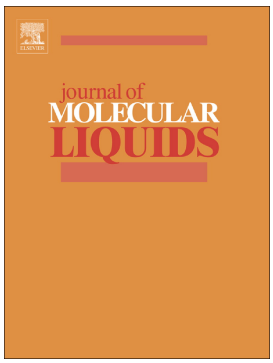

Spectral, thermal and morphological characteristics of ultrasonically synthesized poly(anisidine-co-phenylenediamine)/bentonite nanocomposites: A potential anti-diabetic drug carrier

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Spectral, Thermal and Morphological Characteristics of Ultrasonically Synthesized Poly(Anisidine-co-Phenylenediamine)/Bentonite Nanocomposites: A Potential Anti-Diabetic Drug Carrier

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Abstract

With the aim to explore the drug delivery efficacy of an electroactive copolymer based clay nanocomposite, the present work reports for the first time, ultrasound-assisted copolymerization of o-anisidine and o-phenylenediamine/Bentonite nanocompoistes. The nanocomposites were characterized for their spectral, thermal and morphological characteristics. IR studies revealed the existence of electrostatic interactions between the NH functional groups of the copolymers with the SiO of Bentonite, while XRD analysis confirmed the formation of a partially exfoliated nanocomposite. The polaronic state of the copolymers was shown by UV-visible studies, while TGA confirmed the amount of loading of the copolymer in the clay. The nanocomposites were loaded with metformin hydrochloride (100 mg) – an anti-diabetic drug to investigate the release profiles in intestinal fluid (pH 7.4). Release kinetics followed the zero order model in intestinal fluid (pH 7.4) and showed sustained release. The release behaviour was observed to be influenced by the composition of the copolymers and this property could be utilized to control as well as optimize the release of metformin hydrochloride as per loading and dosage.

Keywords: Conducting polymer, Copolymerization, Clay, Drug Release, Kinetics.