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Extended Abstract

Composite Hydrogels Based on Poly (Methacrilyc Acid) Reinforced with Laponite Inorganic Filler †

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Polymeric hydrogels are soft materials that can absorb large amounts of water or biological fluids without dissolving. The three-dimensional network of a hydrogel is made up of hydrophilic polymer chains that are physically or chemically cross-linked. An important drawback of most hydrogels is their low mechanical strength, which can be improved by forming (nano)composites with clay as the filler.

The aim of this study was to synthesize composite hydrogels based on poly(methacrylic acid) and different concentrations of Laponite. These syntheses were conducted via free radical copolymerization in the presence of N,N′-methylenebisacrylamide as a crosslinking agent and ammonium persulfate as the initiator.

The obtained materials were characterized by FT-IR, X-ray diffraction, microscopy analyses (SEM, TEM), rheological measurements, and swelling studies. The rheological measurements proved that both storage and loss moduli increased with Laponite concentrations. The FTIR and XRD analyses confirmed the incorporation of the clay into the poly(methacrylic acid) hydrogel matrix and also the interactions between the inorganic filler and the polymer chain [1]. The swelling degree was influenced by the amount of Laponite incorporated into the polymer matrix. All hydrogels demonstrated porous architectures as observed by microscopy analyses.

Newly synthesized composite hydrogels based on different concentrations of Laponite were prepared and their properties were tested. Due to the fact that hydrogel properties can be modulated by Laponite concentrations, the designed materials are suitable candidates for pH sensitive controlled drug delivery.

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