

Abstract

# Nanocomposite Hydrogels Based on Poly(*N*-vinyl pyrrolidone) †

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**Abstract:** Poly(*N*-vinyl pyrrolidone) (PNVP) is one of the most studied and recognized polymer for use in the pharmaceutical industry and medicine purposes due to its unique combination of highly essential properties such as nontoxicity, biocompatibility with human tissue, chemical stability, and good solubility in water and other solvents. Most of the PNVP-based hydrogels are characterized by low mechanical properties when handled in a swollen state. For this purpose, several methods have been reported to increase the mechanical properties of these gels by introducing an inorganic clay as a reinforcing agent. The present work deals with the preparation and detailed structural characterization of nanocomposite hydrogels based on amidic *N*-vinyl pyrrolidone (NVP) monomers with or without *N,N*-methylenebis(acrylamide) (MBA) as chemical crosslinker and different concentrations of Laponite XLG as reinforcing agent. The hydrogels were synthesized by the radical polymerization of the monomers using 2,2-azobisisobutyronitrile (AIBN) as the initiator. In this study, we evaluated the structure of PNVP-based nanocomposites by using FT-IR, their morphology through SEM-EDX, and the influence of different amounts of Laponite XLG on the final properties, by performing rheological measurements and swelling studies. The Laponite XLG, used as reinforcing agent, significantly contributed to the improvement in the mechanical properties of the nanocomposite hydrogels.

**Keywords:** hydrogels; poly(*N*-vinyl pyrrolidone); reinforcing agent; nanocomposite; nano-clay



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