

ABSTRACT

Hydrogels are a class of materials intensely studied over time. They have been reported since 1960 and quite recently hydrogels have become one of the most important categories of materials investigated due to their potential applications in a wide range of domains such as medicine and pharmacy (drug delivery, tissue engineering, wound healing), agriculture (controlled release of fertilizers, soil water retention), wastewater treatment, electronics, cosmetics industry, etc.

In this context, the general objective of this doctoral thesis was to study the (nano)composite hydrogels with poly(methacrylic acid) network, following three research directions:

1. Comparative study of the parameters that influence the water absorption and viscoelastic properties of poly(methacrylic acid) based hydrogels;
2. Synthesis and characterization of new (nano)composite hydrogels based on poly(methacrylic acid);
3. Study of the influence of the nature of the reinforcing agent on the properties of (nano)composites hydrogels with poly(methacrylic acid) network.

In this thesis, (nano)composite hydrogels based on poly(methacrylic acid) with different reinforcing agents (Laponite XLG, Laponite XLS, MMT, silica nanoparticles) were synthesized in premiere and were characterized by state-of-the-art methods and techniques.

Thus, this doctoral thesis contributes to the expansion of research in the field of (nano)composite hydrogels with a high potential in the controlled release of drugs but also for the absorption of dyes.

Keywords: hydrogels, poly (methacrylic acid), nanocomposite hydrogels, montmorillonite, laponite, silica nanoparticles, viscoelastic properties, absorption properties, methylene blue, crystal violet, depollutant properties