

Synthesis of Nanogels of PNIPAM-Chitosan

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In this work, novel nanogels sensitive to the temperature were synthesized to depart from PNIPAM, to establish a liberation control according to the temperature of the way. It was characterized by means of DLS (size), AFM (morphology), Potential Z (charge), Microscope of fluorescence (internalization, see figure 1) and tests of cellular viability were realized. These results verify the effects of the structure of a polymer hidrofílico in the LCST of the PNIPAM.[1]

The poli (N-isopropilacrilamida) (PNIPAM) expresses a LCST that corresponds to temperature between 30 and 35 °C induced entropically. The derivatives of the PNIPAM present this behavior of its LCST that structurally depends on the hydrophobicohydrophilic equilibrium of of their polymer chains, according to the number of water molecules joined by means of the bond of hydrogen.

We will use N,N'-Methylenebis(acrylamide) as a cross-linking agent between ANIPAM and Chitosane. The presence of stabilizing agents to control the size of the hydrogels, where 200 nm structures were obtained, as shown in Figure 2, is important.

increasing the temperature of the aqueous medium will result in the conformational transition of the structure of the PNIPAM to achieve a favorable balance to only hydrophobic segments, so water molecules have to spread to the outside of the polymeric nucleous, which by means of the Z potential, a data of 0,1 was obtained.[2]

The synthesis of the nanogels will be carried out in accordance with the following procedure:

In a 3-hole flask, with exits and controller flux of teflon, 195 mg dissolves of the monomer NIPAM in 100 ml of water ultra pure. We will maintain magnetic agitation during the process. After dissolving completely, 1.95 mm are added of N,N'-metylenbisacrisamide (ENCORE) and 10 of dodecyl sulfate of sodium (SDS), the constant agitation is supported up to dissolving completely all the components of the solution.

Next step, it is realized purged directly in the solution to displace the dissolved oxygen, this procedure of purged is supported by means of one hour to constant pressure. Finally, the reaction temperature increases up to 70 °C, later 2.20 mm of persulfate of ammonium are added to the solution of reaction, the temperature, the agitation and the current of nitrogen stay constant for period of 2 hours. The sample will be she will submit to a process of centrifuged 14000 rpm in 15 minutes to separates of nanogel.

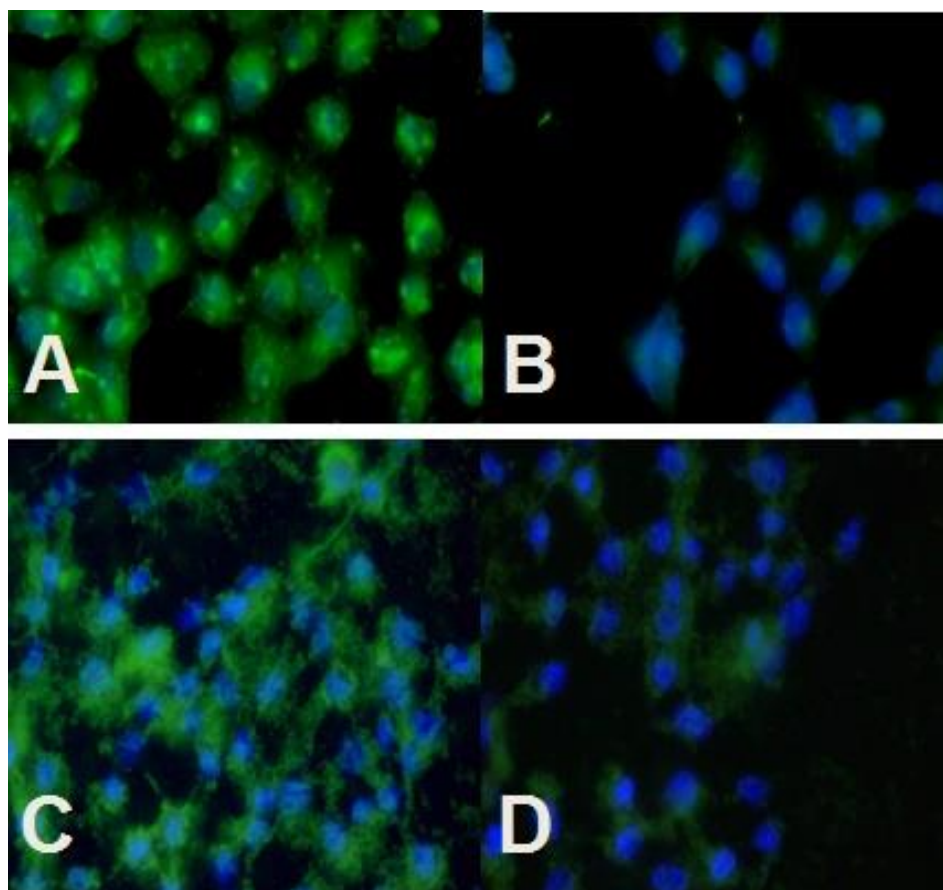


Figure 1. Epithelial cells, A(Membrane), B(nucleus). Cancer cells, C(Membrane), D(Nucleus). Liberation of Np's

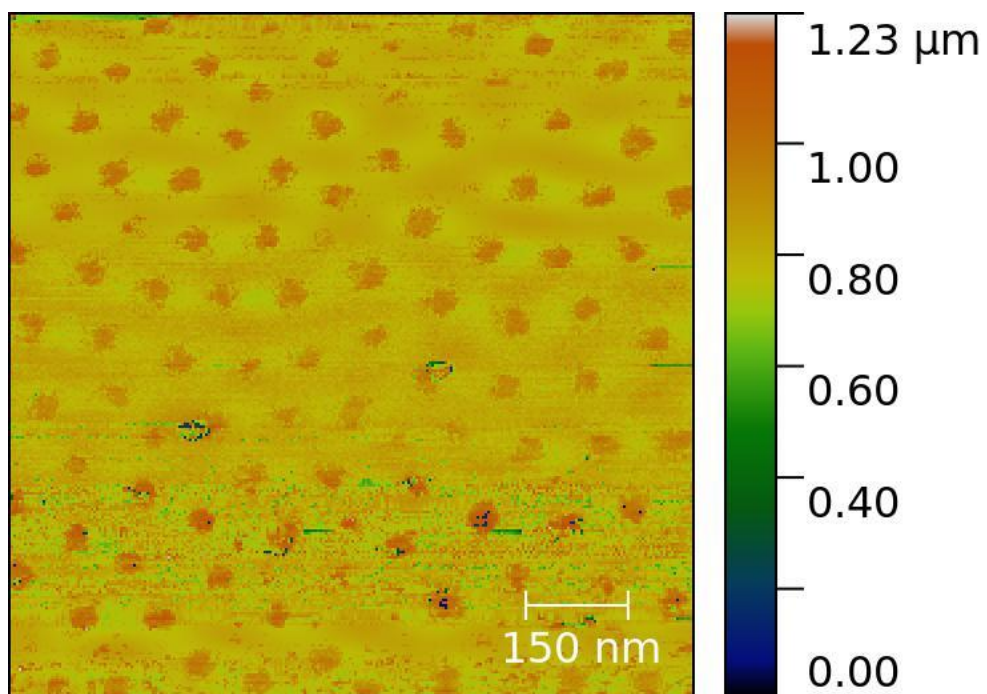


Figure 2. Topography image of PNIPAM's AFM, where we can observe the morphology of the structures of the nanogels, we can observe a uniform distribution of size.

References

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