

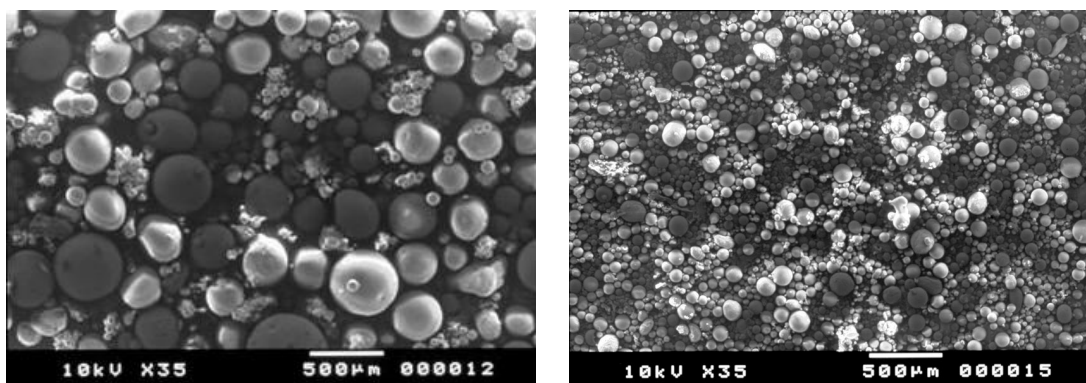
# Use of cellulose nanowhiskers as nucleating agent in obtaining acrylic beads by suspension copolymerization

J.C.O. Villanova<sup>1</sup>, P.S.O. Patrício<sup>1</sup>, F.V. Pereira<sup>2</sup> and R.L. Oréfice<sup>1</sup>

<sup>1</sup>LEPCOM, Universidade Federal de Minas Gerais, MG, Brasil

<sup>2</sup>Departamento de Química, Universidade Federal de Minas Gerais, MG, Brasil

A typical system for the preparation of acrylic copolymers is the suspension polymerization, a technique characterized by the presence of one or more water insoluble monomers and an initiator soluble in the organic phase. Polymerization occurs in droplets of monomers, which should be dispersed by a combination of strong stirring and the use of stabilizers. One of the difficulties reported for obtaining the beads in suspension technique is to control the size and distribution of particles. In an attempt to reduce the size of the beads and achieving more homogeneous distribution, cellulose nanowhiskers (NWCs), anionic in nature and porous, were incorporated in the formulation, which function as nucleating agent. ATR-FTIR spectra were obtained for assessment of polymerization. The morphology and size distribution were analyzed by scanning electron microscopy (SEM). Low concentration of NWCs was enough to allow the formation of beads with small particle size, particle size distribution more uniform and the absence of clusters in the system, when compared to the beads obtained in the absence of NWCs, as shown in Figure 1. The results indicate that the use of NWCs as nucleating agent can provide benefits for the suspension polymerization, even at low concentrations. Due to their high surface area, the NWCs create more cores from which the droplets grow, increasing the number of drops, reducing the size of them and contributing to the maintenance of stability.



(a)

(b)

Figure 1. *Beads* prepared in the absence of NWCs (a) and in the presence of NWCs (b).

Keywords: suspension copolymerization, nucleating agent, cellulose nanowhiskers, SEM.

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*E-mail correspondence: jvillanova@ufmg.br*