

COMBINATION OF SEC & MALDI TECHNIQUES FOR CHARACTERIZATION OF THE CONTINUOUS PHASE IN DISPERSION POLYMERIZATION

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Dispersion polymerization is one of the most attractive dispersed phase polymerization techniques to synthesize nano- and microparticles, since it allows the synthesis of particles with narrow and broad size distributions from a single polymerization step. Dispersions of latex particles in polar and non-polar solvents are important materials in several areas, such as coatings, toners, column packing materials for chromatography, printing plates for lithography, sensors for biomedical and biochemical analysis... Most of the works carried out to understand this type of polymerizations mechanism are related to the study of stabilizer type and concentration, continuous phase composition and type of comonomer. Nevertheless, there are few works related to the characterization of the polymers formed in the continuous phase (also known as the serum).

In this work, the dispersion copolymerization serum of styrene (St) with two different comonomers acrylonitrile (AN) and methyl methacrylate (MMA) in 1-propanol/DDI water medium carried out using polyethylene oxide macromonomer as stabilizer was studied. The serums of the latexes were characterized in terms of molar mass and composition by the combination of Size Exclusion Chromatography (SEC) and Matrix Assisted Laser Desorption Ionization Time of Flight Mass Spectrometry (MALDI-TOF MS). It was found that unreacted macromonomer was present in both copolymer systems. However, in the case of the copolymerization with AN besides the presence of the macromonomer there were also some pAN oligomers. This work demonstrates that the combination of SEC-MALDI techniques can be a powerful strategy for identifying the different species present in the continuous phase in dispersion polymerization.