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### Nanocomposites Based on Montmorillonite/Acrylic Copolymer for Aqueous Coating of Soft Surfaces

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**Keywords** [Acrylate](#), [Aqueous Coating](#), [Clay Nanocomposite](#), [Emulsion Polymerization](#)

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## Nanocomposites Based On Montmorillonite/Acrylic Copolymer for Aqueous Coating of Soft Surfaces

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**Keywords:** Clay-nanocomposites, acrylates, aqueous coating, emulsion polymerization

**Abstract.** Nanocomposites based on layered silicate organically modified montmorillonite (Cloisite 20A) and acrylic comonomers (butyl acrylate and methyl methacrylate) were prepared by simple “in situ” batch emulsion polymerization method. The particle size and zeta potential of the emulsions were analyzed. The structural characterizations of the nanocomposites were performed by FTIR, thermal behaviors of the films were investigated by DSC, mechanical properties of the films were tested by DMA and intercalation success was viewed by XRD. The mechanical properties of the nanocomposites were improved significantly especially at the temperatures above  $T_g$ . The ultrasonication process was found to be useful for increasing the homogeneity of the emulsions and intercalation success. The obtained nanocomposite emulsions were applied on garment leathers in a finishing formulation as aqueous binders sharing good film forming ability and elasticity.

### Introduction

In the last decade the importance of waterborne coatings has been increased because they are more environmental friendly, have less toxicity and improved flame retardant properties. Beside these advantages, it was faced with some disadvantages as decreased mechanical properties, poor water resistance etc. due to the usage of emulsifiers. On the other hand, water-based clay/polymer nanocomposites have become an alternative way to overcome some of these problems and to improve mechanical properties of the polymers. Some recent studies on clay/polymer nanocomposite emulsion polymers have been mostly focused on thermoset or hard thermoplastic polymers in order to obtain better mechanical properties especially for coating of tough surfaces [1-4], but there are only a few studies focused on the improvement of coating properties for soft surfaces, such as textile and leather [5,6].

Due to resistance to hydrolysis, high block resistance, hardness-softness, good adhesiveness and good film forming properties of acrylates, they are the most common polymer emulsions used in several industries for coating purposes [7,8]. Acrylic emulsions used for coating of soft surfaces such as textile and leather materials have the advantages as mentioned above but also they suffer from sticking problems, poor heat resistance and moderate mechanical properties. The aim of this study is to prepare aqueous acrylate/montmorillonite nanocomposites by emulsion polymerization, their characterization and testing as polymer binders for coating of soft surfaces.