

# QUANTITATIVE CHARACTERIZATION OF EXFOLIATION IN POLYAMIDE-6 / LAYERED SILICATE NANOCOMPOSITES

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## ABSTRACT

A quantitative characterization of the structure of polymer/layered silicate nanocomposites is proposed. The methodology, based on TEM image analysis was applied to the quantitative characterization of PA-6/montmorillonite nanocomposites produced by melt-compounding. The influence of the organic modification of the montmorillonite (MMT) on the quality of the dispersion of the clay particles was evaluated quantitatively. The efficiency of a specially designed extruder system was evaluated and compared to a reference nanocomposite produced by *in-situ* polymerization. Surface density, specific area, extent of exfoliation, particle dimensions, and aspect ratio of the dispersed particles were estimated and correlated with mechanical properties.

## INTRODUCTION

The production of polyamide-6/clay (or layered silicate) nanocomposites has been successfully achieved by Usuki *et al.* (1993) and Kojima *et al.* (1993), using *in-situ* polymerization. Polymer/layered silicate nanocomposites (PLSN) are commercially attractive, because they exhibit a broad range of property enhancements, such as high stiffness and strength, outstanding barrier properties, improved thermal stability or reduced flammability. According to Alexandre and Dubois (2000) and LeBaron *et al.*

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