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**DEVELOPMENT OF NOVEL METHODS TO  
PREPARE MONTMORILLONITE-POLYANILINE  
NANOCOMPOSITES**

**A PROJECT REPORT PRESENTED BY**

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## ABSTRACT

The aim of the present study is to prepare of polyaniline (PANi) in Montmorillonite (MMT) clay by novel methods. In-situ polymerization was used to synthesize a novel nanocomposite material based on layered silicate clay and electronically conducting polymers (ICPs): polyaniline (PANi). Montmorillonite (MMT) clay was successfully incorporated into polyaniline to form PANi-clay (PACN) nanocomposites with controlled structure and with improved properties. The effect of processing parameters such as oxidant and HCl concentration on the structure and properties of the nanocomposites were studied by using Fourier transform infrared spectroscopy (FTIR) together with X-ray diffraction. X-ray diffraction analysis provides additional structural information on both PANi and PACN nanocomposites synthesized at different processing conditions. It was shown that the oxidant concentration and HCl concentration plays an important role in controlling the properties and the structure of the PACN.

The conductivity of the resulting mixture was measured using two-probe method and Alternative current impedance technique. The highest conductivities for the polymer composite were of the order of the  $10^{-5} \text{ Scm}^{-1}$  for the nanocomposite polymerized by  $\text{Cu}^{2+}$  where as nanocomposite polymerized by  $\text{Fe}^{3+}$  shows conductivity of the order of the  $10^{-4} \text{ Scm}^{-1}$ .