

**CHEMICAL SYNTHESIS AND CHARACTERIZATION OF  
POLYANILINE**

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## **ABSTRACT**

### **CHEMICAL SYNTHESIS AND CHARACTERIZATION OF POLYANILINE**

Polyaniline powder was prepared by chemically synthesized of aniline monomer in dopant hydrochloric acid solution. The ammonium persulphate solution which was acted as oxidant was added in slowly in the reaction mixture by using magnetic stirrer at room temperature. The reaction took place for 2h to complete the reaction. After 24h left, the dark green mixture was filtered and washed thoroughly with perchloric acid and distilled water. The resulting polymer then was dried under vacuum at 80 °C for 4h. The powder then was characterized by FTIR, TGA, DSC and FESEM. Otherwise, the powder was dissolved in dimethyl sulfoxide and mixed with cellulose triacetate solution in dichloromethane for making composite film. The film was also been characterized and its electrical conductivity was measured by using impedance spectroscopy.

## CHAPTER 1

### INTRODUCTION

#### 1.1 Background

Polyaniline (PANI) has special interest among the other conductive polymers. Aniline is a relatively inexpensive monomer. PANI can be easily synthesized with a good yield by polymerizing aniline in protonic acid aqueous solution in the presence of an oxidant or electrochemically. These advantages combined with its chemical stability and high conductivity in the doped state so that make its commercial application quite attractive.

PANI can be regarded as a conducting polymer under certain stimulating conditions, like UV light, heat or addition of a suitable dopant to the polymer. Many studies have been made to improve the poor mechanical properties and the processibility of PANI by blending it with other polymers or by substitution and copolymerization. Although blending of PANI with other polymers leads to a decrease of its conductivity, it is conceivable that composites with moderate conductivity and good mechanical properties can be obtained by the blending approach (Sayed and Soliman, 2001).

PANi can be prepared by several methods. Interestingly, the formed PANI exists in five different forms, which was achieved through the protonation and doping of the base