CHAPTER I
INTRODUCTION

In recent years, electrical conductive polymers have been widely studied due to their good electrical and optical properties and various industrial applications. With the rapid development of the electrical and particularly the electronics industry, semi-conductive textiles, including yarns and fabrics, have been produced by various techniques. Although fabrication of many conjugated polymer can be produced, these fibers are brittle, expensive to prepare and difficult to manufacture. Thus, coating conductive polymer onto various kinds of fabrics should be an effective way to produce conductive textiles. Many applications of conductive textiles have been made and their range depends on the conductivity of such materials. They have been applied as filters, electromagnetic interference shield (EMI) materials, heating elements, composite structures, and special purpose clothing, like dust and germ-free clothing. They can also be used in military applications i.e., radar-absorbing materials, camouflage netting, microwave antennas, etc. Demands for them have increased strongly due to their strength and flexibility, the wide range of substrate available, and the wide range of surface conductance available in these fabrics.

Conductive polymers have been known for more than two decades. They consist of conjugated polymer chain with π-electrons delocalized along the backbone. There are a number of polymers that are stable under ambient conditions such as polypyrrole (PPY), polythiophene (PTH), and polyaniline (PANI). These polymers can be prepared by the oxidative polymerization of their respective monomers, which may be conducted either chemically or electrochemically. In the neutral, or undoped, form the polymers are either insulating or semi-conducting. Their conductivity can be increased by several orders of magnitude by doping process. The doping of all conducting polymers has previously been accomplished by redox doping. This involves partial addition or removal of electrons to or from the π-system of the polymer

backbone. The oxidized polymer contains cationic moieties that are neutralized or doped with counter-ions. These charge-defects, called bipolarons, are electron holes that serve as the charge carriers and allow the flow of electrons along the polymer chain. Moreover, the degree of conductivity and stability of conductive fabric strongly depend on dopant. Therefore, dopant is one of the most important factors in this process. In recent study conductive polymers have been doped with various organic sulfonic acids with improvements in conductance and stability.

In this research work conductive fabric was prepared by admicellar polymerization technique to produce thin films of conductive polymers coating on polyester fabrics. The coated fabrics were then doped with a variety of dopants in order to improve their electrical conductivity.