

CHAPTER I

INTRODUCTION

Polymers are mostly used for insulator applications. While some of them can be classified as semiconductor because they have one important property namely electrical conductivity, so they are called as conductive polymers. Because of the conjugated bond in structure (alternating single and double bonds or conjugated segments coupled with atoms providing p-orbitals for a continuous orbital overlap), it can transfer electrons (e^-) through its structure. Examples of conductive polymers are polyaniline, polypyrrole, polyacetylene, and etc. (Dai *et al.*, 2004).

A conductive polymer, as doped by a chemical doping agent, possesses charge defects (polaron, bipolaron and soliton) in its structure. These defects induce the polymer to become charge stabilized on polymer chain making polymer chain to become conjugated bond. The doping method can be reacted by chemical doping (partially oxidized or reduced by e^- donors or e^- accepters), electrochemical doping (applied DC power source), photo-doping, charge-injection doping, and non-redox doping (Dai *et al.*, 2004).

Poly *o*-anisidine (POA) is a one type of conductive polymers, a derivative of aniline, it can be synthesized by the electrochemical and chemical oxidation polymerizations (Mazrouaa, 2012). POA can be used as a biosensor, rechargeable batteries, electrochromic displays, gas separation, and etc. Nevertheless, POA exhibits poor electrical conductivity, which limits its many possible applications.

There are many studies on the synthesis of conductive polymer at a nano-structure to improve conductivity properties of the polymer since the nano-structure can increase path ways for electrons transfer. So it is interesting and challenging to synthesize various nano-structure of POA for conductivity applications.

In this work, the synthesis of the nano-structure POA was carried out by chemical oxidation polymerization. The synthesized POA was doped with an acid (HCl) and a surfactant (Sodium dodecyl sulfate), and was characterized to confirm its structure. The work is focused on the effects of temperature, synthesis time, acid concentration, and surfactant concentration.