

CHAPTER IV

CONCLUSIONS

Polyaniline emeraldine base was synthesized by chemical oxidative polymerization in acid condition by using ammoniumperoxydisulfate as an oxidant. The undoped and doped polyaniline films were prepared by N-methyl pyrrolidone (NMP) as a solvent. The insulating form of polyaniline was protonated to the conducting form of polyaniline by using hydrochloric acid, camphorsulfonic acid and ethanesulfonic acid as acid dopant. The doped polyaniline films were prepared by protonation doping in the solution.

The FT-IR and UV-visible results could confirm that in this work polyaniline emeraldine base was synthesized. These results are consistent with those of Zeng *et al.*(1998) and Laakso *et al.*(1994). The EA results indicated that the doping levels (% H/N) increased dramatically with the doping ratio at low molar doping ratio. In case of the HCl doped polyaniline, the doping levels decreased at high molar doping ratio. The degree of crystallinity of doped polyaniline films increased with doping ratio which could be observed from the XRD results. The HCl doped polyaniline films at N_a/N_p more than 496 showed the decrease in degree of crystallinity due to the decrease in the doping ratio.

For the electrical conductivity results, the electrical conductivity of the CSA and ESA doped polyaniline films at the first 20 days were more stable than that of the HCl doped polyaniline films. The HCl doped polyaniline films at N_a/N_p equal to 496 showed the highest electrical conductivity. The HCl doped polyaniline film was unsuitable to use as a SO₂ detector because the change in the electrical conductivity was not observed. While the electrical conductivity of the CSA and ESA doped polyaniline films increased when exposed to SO₂ gas. Thus, the CSA and ESA doped polyaniline film could be

used as a SO₂ detector. The minimum SO₂ concentration that the CSA and ESA doped polyaniline films showed response was 187.5 and 500 ppm, respectively.