CHAPTER V
CONCLUSIONS

Polyaniline emeraldine base can be synthesized by chemically oxidative polymerization. Three different acid dopants were used as acid dopants; HCOOH, HNO_3 , and CSA. The specific conductivity of doped-polyaniline increased as the amount of acid dopant increased. It is evidenced by UV-Visible technique that shows the higher red shift indicating the larger the portion of bipolaron/polaron state. In the cases of PANI-H_2SO_4/CSA and PANI-H_2SO_4/HCOOH obtained the maximum specific conductivity at the N_{EB}/N_A of 1:40 due to the emergence of fibrillar morphology. Unexpectedly, the dedoping process occurred in the case of PANI-H_2SO_4/HCOOH as can be seen in the UV-Visible results. As the dedoping process occurred, it provided back the globular morphology, resulting in the decrease of specific conductivity beyond the N_{EB}/N_A of 1:40. The amount of %Bipolaron and %Polaron had also been studied; it was found that the PANI-H_2SO_4/CSA and PANI-H_2SO_4/HNO_3 have large number of % Bipolaron and %Polaron. Hence, they have higher specific conductivity than PANI-H_2SO_4/HCOOH. However, an acid dopant with lower in pK_a value does not always give a higher specific conductivity. It also depends on the size of counter ion. The smaller size of counter ion has a higher ability to access and protonate the polymer chain. When PANI-H_2SO_4/CSA was exposed to ethanol, the specific conductivity increased since ethanol molecule acted as carrier molecules. For sensitivity study, it was found that PANI-H_2SO_4/CSA at N_{EB}/N_A of 1:160 has a higher sensitivity than that of N_{EB}/N_A of 1:40.