CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

In this work, preparation of PVA/zinc acetate composite fibers and the reaction to convert the composite fibers into ZnO via solvothermal process and conventional method were investigated. The conclusions of the present research are the following:

1. ZnO fibers can be synthesized from PVA/zinc acetate composite fibers via the conventional method.

2. By using solvothermal technique, zinc acetate within the electropun PVA/zinc acetate composite fibers can be converted into ZnO, while PVA is still retained, resulting in ZnO nanostructures with elastic property of PVA.

3. If very low amount of excess zinc acetate powder is placed in the reaction system, the obtained ZnO nanostructures that are synthesized via the solvothermal technique, using PVA/zinc acetate fibers as starting material, are still in fiber form and the particles embedded within the fibers are polycrystalline.

4. Shape of the particles part in the ZnO nanostructures that were synthesized via the solvothermal technique is nanorod. The average length of the nanorod increases with reaction temperature, reaction time and amount of excess zinc acetate powder.

5. During the solvothermal reaction in 1-octanol, zinc acetate starts to completely convert into ZnO at 200 °C and the growth of the ZnO crystals becomes more immense as the reaction temperature is raised to 250 °C.

5.2 Recommendations for Future Work

For synthesis of ZnO nanostructure from PVA/zinc acetate composite fibers via the solvothermal reaction in 1-octanol, effects of various factors, such as PVA-to-zinc acetate ratio and the amount of excess zinc acetate powder as well as reaction conditions for the solvothermal reaction, on yield of ZnO nanostructures were investigated in this work. Some recommendations for future studied are proposed as follows:

1. Type of polymer used in the electrospinning technique or type of solvent employed in the solvothermal technique should be varied and investigated for compatibility.

2. The growth mechanism of ZnO nanostructure via the solvothermal reaction should be further studied in detail.