CHAPTER VI

CONCLUSIONS AND RECOMMENDATION

6.1 Conclusions

In this thesis, it was demonstrated that the transparent zinc oxide thin films could be prepared using sol-gel process and dip coating technique. Zinc acetate dihydrate dissolved in organic solvents was employed as the precursor. The photoinduced hydrophilicity of the fabricated films were investigated its dependence on some experimental variables which were the precursor concentration, withdrawal speed, calcinations temperature and number of coating layers.

In Part A, effect of calcination temperature, withdrawal speed, precursor concentration were explored to find out the suitable condition to prepare transparent film of ZnO coated on glass substrate. It was found that the transparent ZnO thin films could be prepared from zinc acetate solution with concentration of 0.10 M, withdrawal speed of 1.0 cm/min and calcination temperature of 500°C. It should be noted that while 2-methoxyethanol could give rise to translucent films, ethanol could provide ZnO film with excellent transparency.

In order to improve the photoinduced hydrophilic property of the transparent ZnO thin film coated on glass substrate, influences of some variables were experimentally investigated in Part B. From experimental results, the ZnO thin film prepared from zinc acetate with concentration of 0.10 M, withdrawal speed of 3.0 cm/min could exhibit the water contact angle of 5 degree after UV irradiation for 30 min. It was found that the relative roughness and thickness of the fabricated films would affect their photoinduced hydrophilic property. Though the number of coating layers would exert some certain effects on the hydrophilicity, further investigation on mechanism of oxygen vacancy induced by the UV irradiation should be conducted in order to improve the film durability.

6.2 Recommendation for future work

1. To investigate the effect of precursor concentration at the lowest withdrawal speed for film preparation on the improvement photoinduced hydrophilic property.

2. To investigate the effect of light source on photoinduced hydrophilic property such as nature light.