CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Effect of calcination temperature, Ag and Au doping in the suspended system on the catalytic activity of TiO_2 for 4-CP degradation was investigated. The degradation of 4-CP was not affected by the presence of these catalysts compared to the photolysis. The catalyst, however, did affect the intermediate degradation. The total organic carbon degradation rate slightly decreased with increasing the calcination temperature from no treatment to 500 °C because of the sintering of the catalyst. The rate decreased significantly with increasing the calcination temperature from 500 to 600 °C because of the transformation of TiO_2 from anatase to rutile phase.

Adding a small amount of Ag and Au improved the activity of TiO_2 and the highest activity was observed with 0.1%Ag and 0.1%Au. The small amount of Ag and Au on TiO_2 accelerated super oxide radical anion, $O_2^{\bullet-}$, formation and consequently decreased the recombination process and enhanced the photocatalytic activity. However, the addition of Ag also blocks the active site exposed to the UV light.

For TiO_2 immobilized on stainless steel, the photocatalytic efficiency increased with increasing the stage number of the reactor and decreasing the solution flow rate because of increasing the reaction time. The adsorption of 4-CP on TiO_2 was the rate-limiting step. The activity of TiO_2 coated on stainless steel was still high after the regeneration.

5.2 Recommendations

The effect of pH of solution along the system should be investigated in order to push the reaction forward. Ag is suggested to dope on the TiO_2 immobilized on stainless steel along with the electrolyte in order to conduct the e^- to prohibit recombination process.