

CHAPTER V

CONCLUSIONS

The activity of platinum or titanium(IV)oxide alone was extremely low in dehydrogenation of isopropyl alcohol but for platinum loaded on titanium(IV)oxide, the degradation rate of IPA increased significantly. Titanium(IV)oxide acts as a semiconductor that is necessary for generating electron/hole pairs from UV illumination. The Pt sites on the TiO₂ surface are responsible for a better adsorption of isopropyl alcohol and reducing of activation energy.

From the experimental results, the rate of IPA degradation did not depend on the initial IPA concentration that could be expressed by a zero order kinetic equation.

An increase in the catalyst dosage resulted in increasing the rate of IPA degradation since an increase in the active sites is responsible for generating sufficient active species to oxidize IPA. At a very high catalyst dosage, the degradation rate of IPA seems to level off since the catalyst directly affects the light penetration.

Under acidic conditions, the degradation rate of IPA increased drastically because of better adsorption of IPA onto the surface of catalyst. The direct oxidation is predominant while the hydroxyl radical has an influence in the very high pH region around 12.

The dissolved oxygen had a great effect on the photocatalytic degradation of IPA since it can act as an electron scavenger to prevent the recombination process. It also acts as an oxidizing agent itself and generates the hydroxyl radical.