CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

The conclusions emerged from this research are the following:

1. The coke deposit on a dehydrogenation catalyst (Pt/Al_2O_3) consists of three types of coke different classified by easing of combustion, i.e. 1) coke precursor deposits on metal sites but does not completely cover the sites, 2) coke deposits on metal sites and completely covers the sites and 3) coke deposits on support.

2. Temperature - Programmed Oxidation results clearly show 3 peaks. The first peak, at a temperature around 110 °C. The second peak at a temperature around 450 °C and the third peak, locates at a temperature around 550 °C.

3. Changing in the Hydrogen to Hydrocarbon mole ratio in the range between 0 to 3 does not significantly affect the composition of coke. It only obviously affects the amount of coke.

4. Changing in the dehydrogenation reaction temperature significantly affects only the amount of coke not its composition.

5. Series of combustion should be coke 1, coke 2 followed by coke 3 respectively. The combustion of coke 3 should be able to start after coke 2 is removed from the metal sites.

6. The combustion rate of each type of coke can be approximated by the following equation :

$$-dC/dt = k' C^{0.5}$$

where $k' = koPo_2^{m}exp(-Ea/RT)$

The numerical values of kinetic parameters of the coke on the metal site (coke 2) and that of the coke on the support (coke 3) are approximated about

	ln ($koPo_2^{m}$) (arbitary unit)	**Ea/R** (deg.K)
coke 2	16.3	11100
coke 3	6.8	4560

The kinetic parameters from this research work can be used in developing mathematical model for catalyst regenerator design and control.

7. The results obtained from simulations show good agreement with experimentation that both peak heights and peak locations attained from model agree very well with experimental data.

Recommendations

1. Coke combustion on the other dehydrogenation catalysts should be studied and made to determine their kinetic parameters. (Pt-Sn /Al_2O_3, Pt-Sn-Li / Al_2O_3).

2. The operating Temperature - Programmed Oxidation is an effective method for studying the burning characteristic of coke. The experiment should be continued by varying heating rate to verify the validity of the model.