CHAPTER 6

CONCLUSION

The suitable kinetic model of dehydrogenation of ethylbenzene to styrene is

$$r = \frac{kK_1P_E}{1+kP_E}$$

There are many parameters that influence the rate of reaction. Those are

1. Reactor temperature
2. Partial pressure of ethylbenzene
3. Type of diluent
4. Catalyst

Reactor temperature

The rate of dehydrogenation of ethylbenzene to styrene increases when the reaction temperature increases. At the high temperature, above 500 °C, thermal cracking occured.

Partial pressure of ethylbenzene

The rate of dehydrogenation of ethylbenzene to styrene increases when the partial pressure of ethylbenzene decreases. To decrease the partial pressure, the diluent must be added and the volume of the reactor must be increased. Thus, the limit of decreasing the partial

pressure of ethylbenzene is the volume of the reactor.

Type of diluent

There are many diluent, such as H_2O, CO_2, SO_2, N_2, etc. In this thesis use CO_2, N_2, H_2O as a diluent. The effect of diluent on the rate of the reaction are CO_2 CO_2+steam N_2+steam. Because of steam added, it can remove coke deposit from the catalyst (give more vacant active site to catalyst which ethylbenzene can dehydrogenate). The addition of CO_2 to steam may be inhibit the rate of coke deposite by steam.

Catalyst

Catalyst is filled into the reactor to reduce the reaction temperature and increases yield of the product.