Chapter 5

Conclusion and Recommendation

5.1 Conclusions

1. The adsorption isotherms of acetylene on YAO at 323 K is a non-linear type, which corresponds with Langmuir or Freudlich models.

2. The effect of axial dispersion on the profile is so small that the rate of adsorption becomes the role of variation of the concentration profile.

3. The concentration profile disperses longitudinally as an increase in the superficial velocity, whereas the shape of the breakthrough curve becomes compression.

4. A minimum distance required to approach a constant profile depends on the superficial velocity under which the distance tends to vary proportionally with the velocity.

5. Sizes of the adsorbent particles 60-80, 40-60 and 30-40 mesh do not contribute significantly to the shape of the concentration profile.

6. With an increase in the concentration of acetylene, the kinematic viscousity of the fluid decreases, leading to increase Reynolds number. Therefore, the reduction of the fluid properties and the shape of the isotherm cause an increase in the rate of propagation of acetylene in the bed of YAO.

7. The mass transfer coefficients in pores are much smaller than the external film mass trasfer coefficient, thus, the rate of adsorption is controlled by the pore diffusion.

8. The length of the mass transfer zone (MTZ) is a convenient method for monitoring the constant profile.

9. The calculation under constant pattern condition give reliable mass transfer data.

5.2 Recommendations

1. The accuracy of the breakthrough characteristics depend on the accurate flowrate measurement. Low opperating flowrates should be used in order to obtain high precision.

2. For superficial velocity between 5-10 cm/s, a constant shape of the concentration profile is achieved with the column length less than 10cm.

3. Study the adsorption of another by product gas from ethane cracking, such as H_2, CH_4 and C_2H_6, on activated carbon.