

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions.

The linear adsorption isotherms of methane, carbondioxide, and propane can be obtained from equilibrium measurements. And from the adsorption isotherms we see that molecular sieve carbon - 5A adsorbs propane preferentially over carbondioxide and methane. The equilibrium constants from equilibrium measurements are nearly equal to those obtained from the analysis of chromatographic peaks (method of moments).

The adsorption isotherms of mixtures of methane and carbondioxide and mixtures of propane and carbondioxide were obtained based on pure gas isotherms measurements using the ideal solution theory but no experimental confirmations were made.

Molecular sieve carbon - 5A preferentially adsorb gases which have higher molecular weights.

The adsorption rate constants and the intraparticle diffusion coefficients of methane, carbondioxide, and propane can be obtained from evaluation of the chromatographic curves. The breakthrough curves calculated from these parameters agree well with those obtained from the experimental data. It was also found that the rate

determining steps of the adsorption process are the intraparticle diffusion and adsorption steps.

6.2 Recommendations.

1 The accuracy of the chromatographic curve method depends on the flow rate of gases and the frequency of sampling. Low operating flow rates and high frequencies of sampling ought to be used to get highest accuracy.

2 The analysis system must detect the gas concentration at the outlet with high accuracy especially the output of the chromatographic peaks for evaluating the second central moment.

3 The flow rate of the carrier gas must be constant until the last peak of the tracer has been detected.

4 Other studies that could be done could involve other gases and other adsorbents.

5 Additional work on adsorption that ought to be done are the determination of adsorption isotherms at higher pressures using static methods. Or the study of pressure swing or thermal swing adsorption and other adsorption applications.