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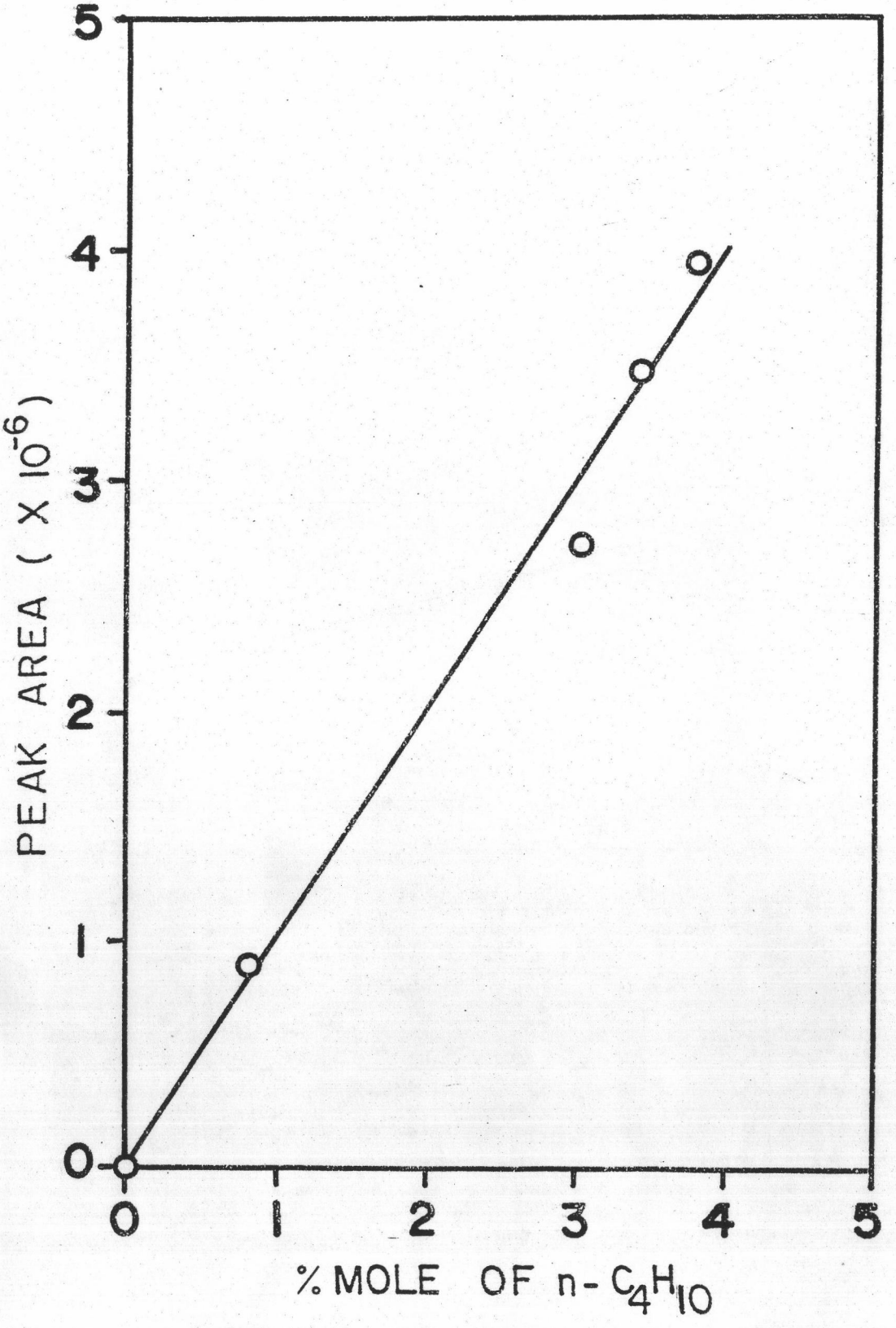
APPENDIX A

The calibration curve for n-butane gas was obtained from the Shimadzu gas chromatograph model 9-APF (FID) using the following condition:

Inj/Det temperature	:	150^{o}C
Column temperature	:	100^{o}C
Carrier gas	:	He
Flow rate	:	20 cc/min


PEAK AREA (X 10⁻⁶)
0
1
2
3
4
5
% MOLE OF n-C4H10

APPENDIX B

As an illustration, an example of calculation of experimental data obtained for Offretite/Erionite zeolite column at T = 250°C is carried out as follow. The specification of the columm is shown.

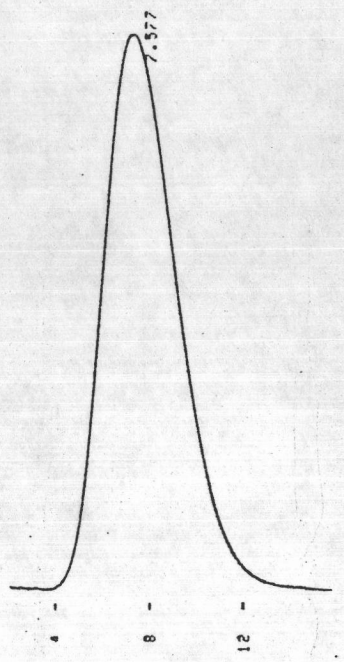
particle size, R_p = 0.212 mm (or 50/60 mesh)

column length, L = 11.97 cm

interparticle porosity, ϵ = 0.424

intraparticle porosity, θ = 0.3702

The zeolite column is subjected to pulse input signal of n-butane in the helium carrier stream. An example of chromatographic response, at flow rate 1.29 cm/s, is detected at the end of the column by FID and shown below.



The response peak is divided into smaller slice area and the integrals are evaluated numerically according to equation (4.13) and (4.14) to obtained the first and second moment results.

the first moment, μ = 477.62 sec

the second moment, σ^2 = 7899.62 sec^2

At the same temperature, the pulse injection is done at various flow rates and the results are shown.

flow rate (cm/s)	μ (sec)	σ^2 (sec^2)
0.72	823.84	36645.12
0.83	639.83	18212.00
1.09	507.29	9943.74
1.29	477.62	7899.62
2.15	298.70	2706.74

The results can be used to calculated the adsorption equilibrium constant for a particle, K_p, from equation (6.1) by plotting $\left(\mu - \frac{L}{v}\right)/\left(\frac{\epsilon}{1-\epsilon}\right)$ versus (L/v) . The plot of the data below are shown in Fig. 6.3 .

$\left(\mu - \frac{L}{v}\right) \Big/ \left(\frac{\epsilon}{1-\epsilon}\right)$ (sec)	(L/v) (sec)
16.57	594.39
14.37	460.53
10.96	365.45
9.23	344.88
5.57	215.84

K_p (obtained from the slope) = 34.65

From equation (4.18), the adsorption equilibrium constant for a crystal can be calculated from K_p. Because there is no binder in zeolite particle, w is then equal to 1. The adsorption constant for a crystal is calculated to be 54.43 .

VITA

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