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APPENDIX

A.1. Selectivity Calculation

A.1.1 Binary Competitive Equilibrium Adsorption Isotherm

The n-paraffin selectivity with respect to n-olefin was determined as

$$\alpha_{P/O} = \frac{X_P / X_O}{Y_P / Y_O} \quad \text{(A.1)}$$

where X_P is the mole fraction of n-paraffin in adsorbed phase.

X_O is the mole fraction of n-olefin in adsorbed phase.

Y_P is the mole fraction of n-paraffin in liquid phase.

Y_O is the mole fraction of n-olefin in liquid phase.

A.1.2 Dynamic Adsorption: Multi-Component Pulse Test

A schematic pulse test is shown in Figure A.1. In this example, the feed contains components A and B along with a tracer. The traced is selected so that it will not be adsorbed by the system being studied. Each peak is indexed on the volume scale at the midpoint of the cord at 50% peak height. The net retention volume of each component is measured using the index of the tracer peak as the zero origin. The adsorbent selectivity for a more strongly adsorbed component B over a less strongly adsorbed component A can be calculated from the ration of net retention volume of component B to component A. (Kulprathipanja and Johnson, 2001)

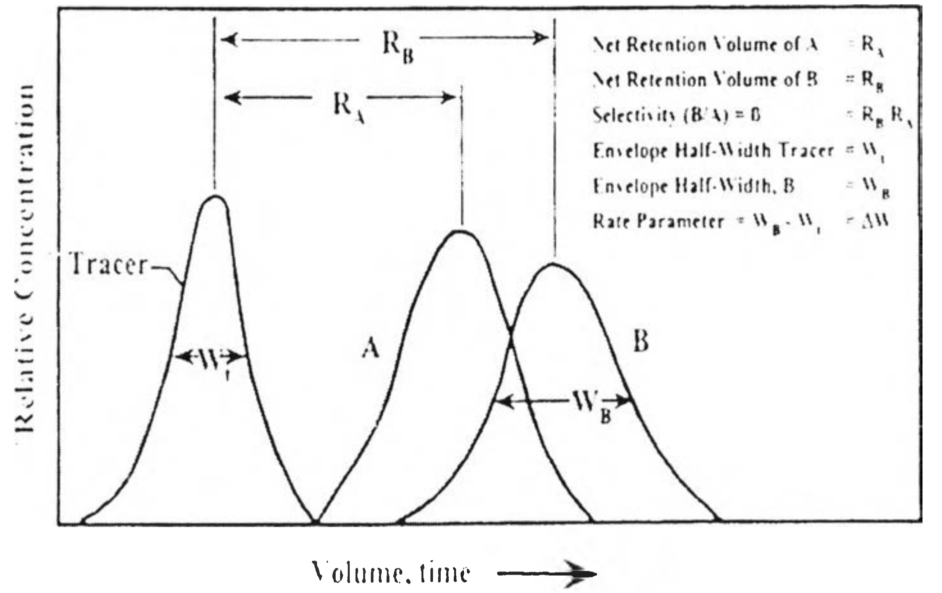

Figure A.1 Schematic pulse test: 2 components and tracer.

A.2. Sample Preparation

A.2.1 Single Component Adsorption Isotherm

Table A.1 Sample preparation for single component adsorption isotherms

wt., g.	Hydrocarbon, g	iso-Octane, g
0.5	0.05	9.95
1	0.1	9.90
1.5	0.15	9.85
2	0.2	9.80
3	0.3	9.70
5	0.5	9.50

A.2.2 Binary Competitive Adsorption Isotherm

Table A.2 Sample preparation for binary competitive adsorption isotherms

Wt., g.	n-Paraffin, g	n-Olefin, g	iso-Octane, g
0.5	0.025	0.025	9.95
1	0.050	0.050	9.90
1.5	0.075	0.075	9.85
2	0.10	0.10	9.80
3	0.15	0.15	9.70
5	0.25	0.25	9.50

A.3. Double Site Langmuir Parameters.

A.3.1 Single Component Adsorption Isotherm

Table A.3 Double site Langmuir parameters for n-paraffin and n-olefin adsorbed on silicalite at 25 °C in single adsorption isotherms

Hydrocarbons	$Q_{max, C}$	Kd_C	$Q_{max, I}$	Kd_I	R
C_6	3.4720	0.0259	3.5866	0.0259	0.9809
1-C_6	2.1646	0.0006	4.7173	0.0237	0.9999
C_8	3.4873	0	0.3378	0.0011	0.9952
1- C_8	3.2070	0	0.6264	0.0798	0.9994
C_{10}	1.9751	0.0074	1.9516	0.0073	0.9941
1- C_{10}	3.7463	0.0064	0.1419	1.0339	0.9999
C_{12}	1.9018	0.0012	1.8615	0.0012	0.9999
1- C_{12}	1.9466	0.0013	1.9028	0.0012	0.9983
C_{14}	1.7581	0.0009	1.6991	0.0009	0.9999
1- C_{14}	1.7906	0.0011	1.7577	0.0011	0.9986
C_{16}	1.4629	0.0012	1.4342	0.0012	0.9981

Hydrocarbons	$Q_{max,C}$	Kd_C	$Q_{max,I}$	Kd_I	R
1- C_{16}	1.5241	0.0097	1.5117	0.0097	0.9995
C_{18}	1.4224	0.1424	1.3881	0.1425	0.9921
1- C_{18}	1.2398	0.0295	1.2094	0.0295	0.9995
C_{20}	1.1907	0.0072	1.1267	0.0072	0.9960
1-C_{20}	1.2365	0.0117	1.1992	0.0117	0.9999

A3.2 <u>Binary Competitive Adsorption Isotherm</u>

Table A.4 Double site Langmuir parameters for n-paraffin and n-olefin adsorbed on silicalite at 25 °C in binary adsorption isotherms

Mixtures	Hydrocarbons	$Q_{max,C}$	Kd_C	$Q_{max,I}$	Kd_I	R
C_6/1-C_6	C_6	0.8207	3.26E-11	2.6262	0.0204	0.9614
	1- C_6	0.7151	5.88E-11	2.6541	0.0155	0.9482
	Total C-6	1.5666	4.24E-11	5.2782	0.0172	0.9510
C_8/1-C_8	C_8	1.7458	0.0012	0.4610	0.1771	0.9996
	1- C_8	0.9024	0.0013	0.9006	0.0013	0.9995
	Total C-8	3.5957	0.0012	0.4059	0.1958	0.9996
C_{16}/1-C_{16}	C_{16}	1.0788	5.18E-11	0.2218	0.0312	0.9966
	1- C_{16}	1.2493	4.07E-12	0.1179	0.1776	0.9971
	Total C-16	2.4115	2.69E-12	0.2544	0.0996	0.9969
C_{18}/1-C_{18}	C_{18}	0.6440	0.0388	0.6234	0.0384	0.9918
	1- C_{18}	0.5967	0.0384	0.5714	0.0384	0.9905
	Total C-18	1.2382	0.0355	1.1927	0.0355	0.9914
C_{20}/1-C_{20}	C_{20}	1.1444	0.0058	0.1110	0.3402	0.9986
	1- C_{20}	0.5496	0.0005	0.5317	0.0006	0.9977
	Total C-20	1.1718	0.0061	1.1392	0.0061	0.9980

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