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APPENDICES

Appendix A Detailed Analysis of Heavy Naphtha (Gas Chromatography Laboratory, Physics and Analysis Division, IFP, Lyon, France)

Table A1 The detailed analysis result classified by family (% m/m)

Family	C3	C4	C6	C7	C8	C9	C10	Total
n-Paraffin	0.011	0.000	5.787	5.011	3.808	2.984	0.109	17.71
iso-Paraffin	0.000	0.007	5.676	5.860	4.714	3.915	1.245	21.417
Naphthene	0.000	0.000	7.611	15.219	8.414	3.605	0.361	35.21
Aromatic	0.000	0.000	3.752	8.210	10.897	2.780	0.024	25.663
Olefin	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
Total	0.011	0.007	22.826	34.300	27.833	13.283	1.739	99.999

Table A2 The detailed analysis result classified by family (% mol/mol)

Family	C3	C4	C6	C7	C8	C9	C10	Total
n-Paraffin	0.026	0.000	6.753	5.029	3.353	2.339	0.077	17.577
iso-Paraffin	0.000	0.012	6.623	5.881	4.150	3.070	0.880	20.616
Naphthene	0.000	0.000	9.094	15.857	7.541	2.871	0.259	35.622
Aromatic	0.000	0.000	4.831	8.961	10.321	2.326	0.018	26.457
Olefin	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
Total	0.026	0.012	27.301	35.457	25.364	10.606	1.234	100

Table A3 The detailed analysis result classified by family (% vol/vol)

Family	C3	C4	C6	C7	C8	C9	C10	Total
n-Paraffin	0.017	0.000	6.624	5.536	4.094	3.145	0.113	19.529
iso-Paraffin	0.000	0.009	6.507	6.481	5.060	4.121	1.286	23.464
Naphthene	0.000	0.000	7.543	15.051	8.258	3.465	0.337	34.654
Aromatic	0.000	0.000	3.226	7.164	9.516	2.425	0.021	22.352
Olefin	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
Total	0.017	0.009	23.900	34.233	26.928	13.156	1.757	100

Appendix B Quantity of Appropriate Zeolite

Table B1 Raw data of quantity of appropriate zeolite

Adsorbent	Replicate	Quantity of adsorbent (g)														
		0.1			0.2			0.3			0.4			0.5		
		Initial (μmole)	Final (μmole)	Efficiency (%)	Initial (μmole)	Final (μmole)	Efficiency (%)	Initial (μmole)	Final (μmole)	Efficiency (%)	Initial (μmole)	Final (μmole)	Efficiency (%)	Initial (μmole)	Final (μmole)	Efficiency (%)
NaX	1	1.5045E-07	3.27299E-08	78.2453	1.5E-07	8.36E-09	94.4456	1.5E-07	3E-09	98.0034	1.5E-07	1.17E-09	99.21456	1.5E-07	0	100
	2	1.5045E-07	2.72665E-08	81.8767	1.5E-07	1.09E-08	92.72654	1.5E-07	4.17E-09	97.22566	1.5E-07	2.35E-09	98.4156	1.5E-07	0	100
	3	1.5045E-07	3.3275E-08	77.8827	1.5E-07	9.26E-09	93.84479	1.5E-07	7.01E-09	95.34256	1.5E-07	2.17E-09	98.5578	1.5E-07	0	100
	4	1.5045E-07	3.59091E-08	76.13223	1.5E-07	1.32E-08	91.21387	1.5E-07	6.85E-09	95.4456	1.5E-07	2.86E-09	98.09896	1.5E-07	0	100
	5	1.5045E-07	2.62753E-08	82.53552	1.5E-07	5.82E-09	96.13075	1.5E-07	2.75E-09	98.17318	1.5E-07	-2.6E-09	101.7259	1.5E-07	0	100
	AVE			79.33449			93.67231			96.83808			99.20856			
SD			2.75036			1.844591			1.366223			1.465377				0
NaY	1	1.5045E-07	3.00815E-08	80.00563	1.5E-07	9.83E-09	93.4531	1.5E-07	6.21E-09	95.8739	1.5E-07	3.53E-09	97.6554	1.5E-07	3.66E-09	97.5641
	2	1.5045E-07	3.09074E-08	79.45667	1.5E-07	7.89E-09	94.7563	1.5E-07	8.7E-09	94.21445	1.5E-07	5.36E-09	96.4359	1.5E-07	4.3E-09	97.1452
	3	1.5045E-07	3.20975E-08	78.6657	1.5E-07	6.19E-09	95.88769	1.5E-07	6.67E-09	95.5664	1.5E-07	3.66E-09	97.5643	1.5E-07	7.01E-09	95.3406
	4	1.5045E-07	2.8771E-08	80.8767	1.5E-07	9.91E-09	93.41237	1.5E-07	6.57E-09	95.6311	1.5E-07	4.34E-09	97.11227	1.5E-07	2.18E-09	98.5478
	5	1.5045E-07	3.58082E-08	76.19928	1.5E-07	8.25E-09	94.51781	1.5E-07	7.84E-09	94.78585	1.5E-07	5.03E-09	96.65463	1.5E-07	-6.4E-09	104.2393
	AVE			79.0408			94.40545			95.21434			97.0845			
SD			1.781105			1.027854			0.692105			0.539068				3.376845

Appendix C Effect of Water Content in Zeolite on the Adsorption of DPM (batch system)

Table C1 Raw data of effect of water content in zeolite on the adsorption of DPM

Adsorbent	replicate	amount of adsorbent (g)	Initial (μmole)	Water content (wt%)														
				0			1			3			5			7		
				Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)	Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)	Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)	Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)	Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)
NaX	1	0.1098	1.536E-07	3.482E-09	1.367E+00	0	1.451E-08	1.267E+00	7.34	1.664E-08	1.247E+00	8.76	1.658E-08	1.248E+00	8.72	1.377E-08	1.273E+00	6.85
	2	0.1054	1.536E-07	1.892E-08	1.278E+00	0	2.891E-08	1.183E+00	7.42	3.904E-08	1.087E+00	14.94	2.113E-08	1.257E+00	1.64	2.792E-08	1.192E+00	6.68
	3	0.1000	1.536E-07	2.982E-08	1.238E+00	0	3.761E-08	1.160E+00	6.29	3.336E-08	1.200E+00	3.02	3.682E-08	1.168E+00	5.65	4.181E-08	1.118E+00	9.68
	4	0.1003	1.536E-07	3.872E-08	1.145E+00	0	3.645E-08	1.168E+00	-1.98	4.433E-08	1.089E+00	4.89	4.324E-08	1.100E+00	3.93	4.585E-08	1.074E+00	6.21
	5	0.1021	1.536E-07	4.962E-08	1.018E+00	0	4.225E-08	1.091E+00	-7.09	2.699E-08	1.240E+00	-21.77	2.210E-08	1.288E+00	-26.47	3.976E-08	1.115E+00	-9.48
	AVE				1.209E+00	0		1.174E+00	2.40		1.173E+00	1.97		1.212E+00	-1.30		1.155E+00	3.99
	SD				1.332E-01	0		6.301E-02	6.60		7.935E-02	14.03		7.666E-02	14.30		7.897E-02	7.65
NaY	1	0.1001	1.536E-07	4.080E-08	1.127E+00	0	1.560E-08	1.379E+00	-22.35	5.346E-08	1.000E+00	11.22	4.900E-08	1.045E+00	7.27	6.345E-08	9.005E-01	20.08
	2	0.1002	1.536E-07	3.015E-08	1.232E+00	0	4.615E-08	1.072E+00	12.96	5.357E-08	9.982E-01	18.97	5.908E-08	9.432E-01	23.44	5.242E-08	1.010E+00	18.05
	3	0.1004	1.536E-07	4.090E-08	1.122E+00	0	5.297E-08	1.002E+00	10.71	5.769E-08	9.552E-01	14.90	5.161E-08	1.016E+00	9.50	4.905E-08	1.041E+00	7.23
	4	0.1003	1.536E-07	3.768E-08	1.156E+00	0	4.548E-08	1.078E+00	6.73	6.336E-08	8.956E-01	22.15	5.105E-08	1.022E+00	11.53	5.430E-08	9.899E-01	14.34
	5	0.1000	1.536E-07	6.260E-08	9.099E-01	0	7.131E-08	8.228E-01	9.57	3.613E-08	1.175E+00	-29.10	6.215E-08	9.144E-01	-0.50	8.238E-08	7.121E-01	21.73
	AVE				1.109E+00	0		1.071E+00	3.53		1.006E+00	7.63		9.881E-01	10.25		9.307E-01	16.29
	SD				1.198E-01	0		2.006E-01	14.63		1.030E-01	20.94		5.612E-02	8.67		1.329E-01	5.77

Appendix D The Adsorption Isotherm in n-Heptane (batch system)

Table D1 Raw data of the adsorption isotherm of NaX at 30, 40 and 50°C

Adsorbent	Temperature (°C)	Replicate	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent
NaX	30	1	5.894E+00	9.917E+00	6.798E+01	2.588E+01	1.106E+02	4.012E+01	1.716E+02	5.163E+01	2.470E+02	6.434E+01	2.918E+02	7.339E+01	3.488E+02	7.439E+01	4.260E+02	7.602E+01
		2	5.110E+00	8.109E+00	6.510E+01	2.454E+01	1.120E+02	4.178E+01	1.721E+02	4.883E+01	2.451E+02	6.488E+01	2.939E+02	7.300E+01	3.530E+02	7.449E+01	4.330E+02	8.001E+01
		3	6.022E+00	9.183E+00	6.409E+01	2.100E+01	1.130E+02	4.299E+01	1.711E+02	5.200E+01	2.440E+02	6.499E+01	2.903E+02	7.299E+01	3.510E+02	7.400E+01	4.310E+02	7.389E+01
		4	5.679E+00	9.619E+00	6.684E+01	2.201E+01	1.109E+02	4.192E+01	1.709E+02	5.187E+01	2.457E+02	6.499E+01	2.903E+02	7.312E+01	3.507E+02	7.500E+01	4.379E+02	7.298E+01
		5	4.889E+00	7.768E+00	6.629E+01	2.337E+01	1.047E+02	3.899E+01	1.690E+02	5.503E+01	2.455E+02	6.274E+01	2.835E+02	7.443E+01	3.465E+02	7.406E+01	4.259E+02	8.496E+01
AVE		5.519E+00	8.919E+00	6.606E+01	2.336E+01	1.102E+02	4.116E+01	1.709E+02	5.187E+01	2.455E+02	6.439E+01	2.900E+02	7.339E+01	3.500E+02	7.439E+01	4.308E+02	7.757E+01	
SD		4.958E-01	9.402E-01	1.512E+00	1.945E+00	3.249E+00	1.589E+00	1.171E+00	2.198E+00	1.072E+00	9.621E-01	3.930E+00	6.037E-01	2.455E+00	4.003E-01	5.071E+00	4.939E+00	
NaX	40	1	8.678E+00	9.337E+00	3.509E+01	1.289E+01	7.809E+01	3.078E+01	1.437E+02	3.967E+01	1.918E+02	5.179E+01	2.287E+02	5.065E+01	3.366E+02	5.967E+01	5.149E+02	6.967E+01
		2	6.119E+00	1.001E+01	3.622E+01	1.388E+01	8.167E+01	3.199E+01	1.400E+02	4.199E+01	1.906E+02	5.189E+01	2.359E+02	5.067E+01	3.389E+02	6.066E+01	5.204E+02	6.084E+01
		3	7.675E+00	1.035E+01	3.799E+01	1.399E+01	7.977E+01	3.295E+01	1.412E+02	4.087E+01	1.877E+02	5.163E+01	2.318E+02	5.066E+01	3.356E+02	5.999E+01	5.198E+02	6.130E+01
		4	7.893E+00	9.672E+00	3.498E+01	1.376E+01	8.090E+01	3.278E+01	1.430E+02	4.056E+01	1.895E+02	5.101E+01	2.348E+02	5.078E+01	3.347E+02	6.012E+01	5.204E+02	6.693E+01
		5	7.765E+00	7.343E+00	3.874E+01	9.704E+00	7.937E+01	3.072E+01	1.393E+02	3.967E+01	1.878E+02	5.031E+01	2.189E+02	5.000E+01	3.282E+02	5.920E+01	5.090E+02	6.419E+01
AVE		7.630E+00	9.341E+00	3.661E+01	1.285E+01	8.000E+01	3.185E+01	1.414E+02	4.055E+01	1.895E+02	5.132E+01	2.300E+02	5.055E+01	3.348E+02	5.993E+01	5.169E+02	6.459E+01	
SD		9.236E-01	1.179E+00	1.697E+00	1.810E+00	1.369E+00	1.062E+00	1.892E+00	9.643E-01	1.765E+00	6.643E-01	6.816E+00	3.109E-01	3.991E+00	5.436E-01	5.000E+00	3.753E+00	
NaX	50	1	1.299E+01	9.187E+00	4.956E+01	2.277E+01	6.810E+01	2.599E+01	1.588E+02	4.076E+01	1.039E+02	3.593E+01	1.886E+02	4.578E+01	4.003E+02	5.673E+01	5.079E+02	5.751E+01
		2	1.154E+01	1.019E+01	4.811E+01	2.289E+01	7.391E+01	2.386E+01	1.508E+02	3.890E+01	1.050E+02	3.501E+01	1.821E+02	4.556E+01	3.955E+02	5.161E+01	5.084E+02	5.590E+01
		3	1.276E+01	9.235E+00	5.349E+01	2.301E+01	6.841E+01	2.310E+01	1.561E+02	3.999E+01	1.068E+02	3.512E+01	1.807E+02	4.556E+01	3.906E+02	5.082E+01	4.929E+02	6.380E+01
		4	1.099E+01	1.013E+01	5.087E+01	2.468E+01	7.028E+01	2.498E+01	1.529E+02	3.978E+01	1.037E+02	3.542E+01	1.878E+02	4.509E+01	3.874E+02	6.037E+01	4.987E+02	6.037E+01
		5	7.867E+00	6.950E+00	5.693E+01	2.026E+01	7.202E+01	2.329E+01	1.516E+02	3.932E+01	1.063E+02	3.814E+01	1.979E+02	4.564E+01	4.099E+02	5.588E+01	5.243E+02	5.665E+01
AVE		1.123E+01	9.143E+00	5.179E+01	2.272E+01	7.054E+01	2.424E+01	1.540E+02	3.975E+01	1.055E+02	3.592E+01	1.874E+02	4.553E+01	3.967E+02	5.508E+01	5.064E+02	5.885E+01	
SD		2.055E+00	1.313E+00	3.489E+00	1.579E+00	2.453E+00	1.220E+00	3.351E+00	7.067E-01	1.129E+00	1.289E+00	6.802E+00	2.590E-01	8.837E+00	3.923E+00	1.192E+01	3.246E+00	

Table D2 Raw data of the adsorption isotherm of NaY at 30, 40 and 50°C

Adsorbent	Temperature (°C)	Replicate	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent
NaY	30	1	8.789E+00	7.582E+00	7.839E+01	4.189E+01	1.407E+02	4.956E+01	2.095E+01	1.774E+01	1.831E+02	5.789E+01	2.519E+02	6.478E+01	2.809E+01	2.601E+01	4.309E+02	5.083E+01
		2	7.003E+00	7.718E+00	7.501E+01	4.078E+01	1.430E+02	5.001E+01	1.941E+01	1.994E+01	1.860E+02	5.803E+01	2.599E+02	6.501E+01	2.776E+01	2.601E+01	4.290E+02	5.103E+01
		3	9.839E+00	8.110E+00	7.632E+01	4.289E+01	1.452E+02	4.855E+01	1.665E+01	1.500E+01	1.823E+02	5.853E+01	2.539E+02	6.469E+01	2.890E+01	2.688E+01	4.271E+02	4.483E+01
		4	8.068E+00	8.567E+00	7.799E+01	4.134E+01	1.411E+02	4.900E+01	1.699E+01	1.784E+01	1.831E+02	5.849E+01	2.569E+02	6.469E+01	3.076E+01	2.599E+01	4.309E+02	4.785E+01
		5	6.508E+00	1.115E+01	8.150E+01	3.920E+01	1.374E+02	5.160E+01	9.773E+00	1.868E+01	1.670E+02	5.949E+01	2.652E+02	6.426E+01	2.986E+01	2.514E+01	4.279E+02	4.891E+01
	AVE	8.041E+00	8.625E+00	7.788E+01	4.122E+01	1.415E+02	4.975E+01	1.676E+01	1.784E+01	1.803E+02	5.849E+01	2.576E+02	6.468E+01	2.908E+01	2.601E+01	4.292E+02	4.869E+01	
	SD	1.344E+00	1.460E+00	2.465E+00	1.374E+00	2.921E+00	1.173E+00	4.286E+00	1.814E+00	7.566E+00	6.265E+01	5.244E+00	2.732E+01	1.245E+00	6.159E+01	1.740E+00	2.535E+00	
	40	1	2.157E+01	9.734E+00	3.210E+01	1.077E+01	5.854E+01	1.745E+01	3.219E+02	3.798E+01	1.596E+02	2.865E+01	2.186E+02	3.500E+01	3.975E+02	4.188E+01	4.605E+02	5.290E+01
		2	1.920E+01	8.774E+00	3.210E+01	8.988E+00	5.984E+01	1.900E+01	3.298E+02	3.785E+01	1.533E+02	2.888E+01	2.269E+02	3.400E+01	3.930E+02	4.100E+01	4.620E+02	4.504E+01
		3	1.798E+01	7.699E+00	2.813E+01	1.073E+01	6.109E+01	1.873E+01	3.211E+02	3.600E+01	1.579E+02	2.901E+01	2.199E+02	3.500E+01	3.887E+02	4.200E+01	4.497E+02	4.628E+01
		4	1.870E+01	7.445E+00	3.009E+01	9.637E+00	6.357E+01	1.778E+01	3.260E+02	3.701E+01	1.589E+02	2.913E+01	2.247E+02	3.599E+01	3.908E+02	4.101E+01	4.507E+02	5.064E+01
		5	1.749E+01	1.011E+01	2.758E+01	1.249E+01	5.696E+01	1.467E+01	3.206E+02	4.839E+01	1.390E+02	3.061E+01	2.565E+02	3.789E+01	3.827E+02	6.916E+01	4.590E+02	4.858E+01
	AVE	1.899E+01	8.752E+00	3.000E+01	1.052E+01	6.000E+01	1.752E+01	3.239E+02	3.949E+01	1.537E+02	2.926E+01	2.293E+02	3.558E+01	3.905E+02	4.701E+01	4.564E+02	4.869E+01	
	SD	1.584E+00	1.186E+00	2.131E+00	1.334E+00	2.517E+00	1.720E+00	3.946E+00	5.148E+00	8.589E+00	7.791E+01	1.558E+01	1.473E+00	5.484E+00	1.239E+01	5.747E+00	3.189E+00	
	50	1	3.948E+01	1.001E+01	6.706E+01	1.274E+01	1.869E+02	2.799E+01	1.706E+02	2.499E+01	2.661E+02	3.263E+01	2.591E+02	3.193E+01	3.521E+02	3.790E+01	4.237E+02	3.894E+01
		2	3.601E+01	9.117E+00	6.023E+01	1.888E+01	2.008E+02	2.710E+01	1.690E+02	2.310E+01	2.690E+02	3.086E+01	2.571E+02	3.089E+01	3.497E+02	3.785E+01	4.151E+02	3.568E+01
		3	3.510E+01	8.099E+00	6.391E+01	1.279E+01	1.923E+02	2.700E+01	1.770E+02	2.591E+01	2.710E+02	3.299E+01	2.561E+02	3.139E+01	3.481E+02	3.709E+01	4.131E+02	3.568E+01
		4	3.189E+01	6.918E+00	6.790E+01	1.298E+01	1.899E+02	2.500E+01	1.731E+02	2.599E+01	2.721E+02	3.277E+01	2.590E+02	3.201E+01	3.515E+02	3.700E+01	4.206E+02	4.037E+01
		5	1.466E+01	6.193E+00	8.139E+01	1.732E+00	1.776E+02	2.767E+01	1.696E+02	2.717E+01	2.673E+02	3.377E+01	2.615E+02	3.052E+01	3.486E+02	3.690E+01	4.125E+02	4.325E+01
	AVE	8.789E+00	7.582E+00	7.859E+01	4.189E+01	1.407E+02	4.956E+01	2.095E+01	1.774E+01	1.831E+02	5.789E+01	2.519E+02	6.478E+01	2.809E+01	2.601E+01	4.290E+02	5.083E+01	
	SD	7.003E+00	7.718E+00	7.501E+01	4.078E+01	1.430E+02	5.001E+01	1.941E+01	1.994E+01	1.860E+02	5.803E+01	2.599E+02	6.501E+01	2.776E+01	2.601E+01	4.290E+02	5.103E+01	

Appendix E The Effect of Alicyclic and Aromatic Hydrocarbons on DPM Adsorption (batch system)

Table E1 The results of the effect of cyclohexane on DPM adsorption

Adsorbent	replicate	amount of adsorbent (g)	Initial (μmole)	Cyclohexane (wt%)														
				0			5			10			20			25		
				Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)	Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)	Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)	Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)	Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)
NaX	1	0.1000	1.549E-07	3.350E-08	1.20093	0	-5.347E-09	1.58937	-32.34	4.072E-08	1.12873	6.01	4.967E-08	1.03922	13.47	6.080E-08	0.92789	22.74
	2	0.1002	1.549E-07	2.660E-08	1.26735	0	4.010E-08	1.132678	10.63	3.337E-08	1.19983	5.33	5.102E-08	1.02367	19.23	3.780E-08	1.15562	8.82
	3	0.1021	1.549E-07	3.073E-08	1.203315	0	3.058E-08	1.20479	-0.12	3.482E-08	1.163223	3.33	3.696E-08	1.14227	5.07	3.329E-08	1.178291	2.08
	4	0.1022	1.549E-07	2.417E-08	1.26638	0	1.308E-08	1.37489	-8.57	3.109E-08	1.19866	5.35	4.457E-08	1.06673	15.77	3.549E-08	1.155529	8.75
	5	0.1004	1.549E-07	4.234E-08	1.108E+00	0	9.891E-08	5.446E-01	50.85	5.947E-08	9.375E-01	15.39	2.386E-08	1.292E+00	-16.62	3.065E-08	1.224E+00	-10.51
	AVE				1.209E+00	0		1.169E+00	4.09		1.126E+00	7.08		1.113E+00	7.38		1.128E+00	6.38
SD				6.516E-02	0		3.910E-01	30.55		1.092E-01	4.75		1.101E-01	14.39		1.155E-01	12.07	
NaY	1	0.1001	1.549E-07	4.316E-08	1.103187	0	5.256E-08	1.00927	8.51	4.693E-08	1.06553	3.41	5.343E-08	1.0006	9.30	4.585E-08	1.07635	2.43
	2	0.1012	1.549E-07	3.637E-08	1.15628	0	4.224E-08	1.10034	4.84	4.224E-08	1.100325	4.84	4.797E-08	1.04367	9.74	4.567E-08	1.06619	7.77
	3	0.1005	1.549E-07	3.874E-08	1.142778	0	4.523E-08	1.07821	5.65	3.522E-08	1.177802	-3.06	5.327E-08	0.9982	12.65	4.272E-08	1.103E+00	3.46
	4	0.1011	1.549E-07	4.235E-08	1.100327	0	5.260E-08	0.99889	9.22	5.323E-08	0.99267	9.78	4.675E-08	1.05673	3.96	3.473E-08	1.175668	-6.85
	5	0.1000	1.549E-07	4.918E-08	1.044E+00	0	2.979E-08	1.238E+00	-18.57	5.304E-08	1.006E+00	3.69	2.580E-08	1.278E+00	-22.39	5.754E-08	9.605E-01	8.01
	AVE				1.109E+00	0		1.085E+00	1.93		1.068E+00	3.73		1.075E+00	2.65		1.076E+00	2.97
SD				4.388E-02	0		9.597E-02	11.61		7.531E-02	4.59		1.161E-01	14.35		7.764E-02	6.03	

Table E2 The results of the effect of ethylbenzene on DPM adsorption

Adsorbent	replicate	amount of adsorbent (g)	Initial (μmole)	Ethylbenzene (wt%)														
				0			5			10			20			25		
				Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)	Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)	Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)	Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)	Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)
NaX	1	1	0.1022	1.570E-07	3.085E-08	1.201E+00	0	2.428E-08	1.299E+00	-8.16	3.359E-08	1.208E+00	-0.57	4.199E-08	1.126E+00	6.27	4.683E-08	1.078E+00
	2	2	0.1006	1.570E-07	2.609E-08	1.267E+00	0	3.338E-08	1.229E+00	3.02	3.622E-08	1.201E+00	5.24	4.320E-08	1.132E+00	10.71	5.184E-08	1.046E+00
	3	3	0.1002	1.570E-07	3.302E-08	1.203E+00	0	3.695E-08	1.198E+00	0.41	3.642E-08	1.204E+00	-0.03	3.850E-08	1.183E+00	1.70	4.953E-08	1.073E+00
	4	4	0.1001	1.570E-07	2.683E-08	1.266E+00	0	3.333E-08	1.236E+00	2.42	3.053E-08	1.264E+00	0.21	4.347E-08	1.135E+00	10.41	4.607E-08	1.108E+00
	5	5	0.1002	1.570E-07	4.256E-08	1.108E+00	0	3.719E-08	1.196E+00	-7.94	4.137E-08	1.154E+00	-4.17	4.783E-08	1.090E+00	1.65	4.960E-08	1.072E+00
	AVE	AVE				1.209E+00	0		1.232E+00	-2.05		1.206E+00	0.13		1.133E+00	6.15		1.075E+00
SD	SD				6.516E-02	0		4.162E-02	5.56		3.888E-02	3.36		3.323E-02	4.45		1.075E+00	
NaY	1	1	0.1000	1.570E-07	4.327E-08	1.103E+00	0	4.230E-08	1.147E+00	-4.00	3.711E-08	1.199E+00	-8.70	4.446E-08	1.126E+00	-2.04	4.700E-08	1.100E+00
	2	2	0.1100	1.570E-07	2.640E-08	1.156E+00	0	2.874E-08	1.166E+00	-0.86	3.722E-08	1.089E+00	5.80	2.735E-08	1.179E+00	-1.96	3.393E-08	1.301E+00
	3	3	0.1009	1.570E-07	3.828E-08	1.143E+00	0	3.976E-08	1.162E+00	-1.70	4.612E-08	1.099E+00	3.81	4.373E-08	1.123E+00	1.74	5.832E-08	9.783E-01
	4	4	0.1005	1.570E-07	4.301E-08	1.100E+00	0	4.119E-08	1.153E+00	-4.75	4.649E-08	1.100E+00	0.04	4.268E-08	1.138E+00	-3.41	5.992E-08	9.663E-01
	5	5	0.1024	1.570E-07	4.668E-08	1.044E+00	0	4.854E-08	1.059E+00	-1.48	1.570E-07		1.01	5.551E-08	9.914E-01	5.05	4.033E-08	1.140E+00
	AVE	AVE				1.109E+00	0		1.138E+00	-2.56		1.122E+00	0.39		1.111E+00	-0.12		1.097E+00
SD	SD				4.388E-02	0		4.430E-02	1.71		5.177E-02	5.57		7.070E-02	3.46		1.366E-01	

Table E3 The results of the effect of *o*-xylene on DPM adsorption

Adsorbent	replicate	amount of adsorbent (g)	Initial (μmole)	<i>o</i> -Xylene (wt%)														
				0			5			10			20			25		
				Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)	Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)	Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)	Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)	Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)
NaX	1	0.1011	1.567E-07	3.218E-08	1.201E+00	0	4.906E-08	1.034E+00	13.91	4.867E-08	1.038E+00	13.58	5.228E-08	1.002E+00	16.56	5.469E-08	9.782E-01	18.55
	2	0.1020	1.567E-07	2.432E-08	1.267E+00	0	4.826E-08	1.031E+00	18.52	4.927E-08	1.023E+00	19.30	5.045E-08	1.011E+00	20.21	4.697E-08	1.045E+00	17.52
	3	0.1013	1.567E-07	3.169E-08	1.203E+00	0	5.049E-08	1.018E+00	15.42	4.542E-08	1.068E+00	11.26	5.226E-08	1.000E+00	16.87	5.201E-08	1.003E+00	16.66
	4	0.1014	1.567E-07	2.518E-08	1.266E+00	0	4.971E-08	1.025E+00	19.10	4.858E-08	1.036E+00	18.22	5.105E-08	1.011E+00	20.15	4.958E-08	1.026E+00	19.01
	5	0.1000	1.567E-07	4.278E-08	1.108E+00	0	4.806E-08	1.055E+00	4.76	5.475E-08	9.884E-01	10.80	5.162E-08	1.020E+00	7.97	5.565E-08	9.794E-01	11.61
	AVE				1.209E+00	0		1.033E+00	14.14		1.030E+00	14.63		1.009E+00	16.35		1.006E+00	16.67
	SD				6.516E-02	0		1.416E-02	5.77		2.874E-02	3.93		7.855E-03	5.00		1.006E+00	2.97
NaY	1	0.1021	1.567E-07	4.095E-08	1.103E+00	0	5.092E-08	1.006E+00	8.84	5.110E-08	1.004E+00	9.01	4.854E-08	1.029E+00	6.73	5.138E-08	1.001E+00	9.25
	2	0.1002	1.567E-07	3.773E-08	1.156E+00	0	5.050E-08	1.029E+00	11.02	5.111E-08	1.023E+00	11.54	5.220E-08	1.012E+00	12.48	5.327E-08	1.001E+00	13.41
	3	0.1001	1.567E-07	3.920E-08	1.143E+00	0	5.077E-08	1.027E+00	10.12	5.120E-08	1.023E+00	10.49	4.145E-08	1.120E+00	1.97	5.093E-08	1.026E+00	10.25
	4	0.1004	1.567E-07	4.312E-08	1.100E+00	0	5.089E-08	1.023E+00	7.04	4.865E-08	1.045E+00	5.00	5.100E-08	1.022E+00	7.13	5.298E-08	1.002E+00	8.92
	5	0.1011	1.567E-07	4.804E-08	1.044E+00	0	5.686E-08	9.568E-01	8.36	6.061E-08	9.197E-01	1.01	5.671E-08	9.582E-01	8.22	4.951E-08	1.029E+00	1.42
	AVE				1.109E+00	0		1.008E+00	9.07		1.003E+00	7.41		1.028E+00	7.31		1.012E+00	8.65
	SD				4.388E-02	0		3.023E-02	1.55		4.878E-02	4.36		5.850E-02	3.76		1.428E-02	4.42

Table E4 The results of the effect of toluene on DPM adsorption

Adsorbent	replicate	amount of adsorbent (g)	Initial (μmole)	Toluene (wt%)														
				0			5			10			20			25		
				Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)	Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)	Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)	Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)	Final (μmole)	μmole of adsorbed DPM/g of adsorbent	Decrease (%)
NaX	1	0.1002	1.487E-07	3.326E-08	1.201E+00	0	3.020E-08	1.183E+00	1.50	3.577E-08	1.127E+00	6.12	4.179E-08	1.067E+00	11.13	4.956E-08	9.897E-01	17.59
	2	0.1020	1.487E-07	2.432E-08	1.267E+00	0	3.494E-08	1.116E+00	11.97	2.855E-08	1.178E+00	7.03	2.957E-08	1.168E+00	7.82	3.558E-08	1.109E+00	12.47
	3	0.1100	1.487E-07	2.123E-08	1.203E+00	0	2.561E-08	1.119E+00	6.98	1.912E-08	1.178E+00	2.08	3.123E-08	1.068E+00	11.23	5.370E-08	8.639E-01	28.21
	4	0.1004	1.487E-07	2.645E-08	1.266E+00	0	4.799E-08	1.003E+00	20.77	3.081E-08	1.175E+00	7.25	4.047E-08	1.078E+00	14.85	5.061E-08	9.773E-01	22.83
	5	0.1003	1.487E-07	4.245E-08	1.108E+00	0	5.097E-09	1.432E+00	-29.24	2.904E-08	1.193E+00	-7.69	4.167E-08	1.067E+00	3.67	5.392E-08	9.452E-01	14.69
	AVE				1.209E+00	0		1.171E+00	2.40		1.170E+00	2.96		1.090E+00	9.74		9.771E-01	19.16
SD				6.516E-02	0		1.598E-01	19.05		2.507E-02	6.31		4.403E-02	4.21		9.771E-01	6.37	
NaY	1	0.1023	1.487E-07	4.073E-08	1.103E+00	0	3.581E-08	1.104E+00	-0.05	4.820E-08	9.827E-01	10.92	5.203E-08	9.453E-01	14.32	5.602E-08	9.063E-01	17.85
	2	0.1021	1.487E-07	3.553E-08	1.156E+00	0	2.521E-08	1.210E+00	-4.63	2.694E-08	1.193E+00	-3.17	4.833E-08	9.833E-01	14.96	5.571E-08	9.110E-01	21.21
	3	0.1025	1.487E-07	3.646E-08	1.143E+00	0	3.165E-08	1.142E+00	0.05	4.641E-08	9.983E-01	12.65	4.528E-08	1.009E+00	11.68	5.535E-08	9.110E-01	20.28
	4	0.1021	1.487E-07	4.125E-08	1.100E+00	0	3.640E-08	1.100E+00	0.01	5.687E-08	8.997E-01	18.24	5.702E-08	8.982E-01	18.37	5.680E-08	9.004E-01	18.17
	5	0.1011	1.487E-07	4.804E-08	1.044E+00	0	5.111E-08	9.656E-01	7.52	6.694E-08	8.090E-01	1.01	6.015E-08	8.762E-01	16.08	5.842E-08	8.932E-01	14.45
	AVE				1.109E+00	0		1.104E+00	0.58		9.765E-01	7.93		9.425E-01	15.08		9.044E-01	18.39
SD				4.388E-02	0		8.920E-02	4.37		1.426E-01	8.78		5.588E-02	2.45		7.615E-03	2.62	

Appendix F The Adsorption Isotherm in Heavy Naphtha (batch system)

Table F1 Raw data of the adsorption isotherm of NaX at 30, 40 and 50°C

Adsorbent	Temperature (°C)	Replicate	Equilibrium conc (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc (ppm)	μmole of adsorbed DPM/g of adsorbent		
NaX	30	1	2.004E+02	3.301E+01	2.240E+02	4.074E+01	3.206E+02	4.699E+01	3.586E+02	4.599E+01	3.709E+01	1.063E+01	6.843E+01	1.593E+01						
		2	1.871E+02	3.412E+01	2.181E+02	3.988E+01	3.211E+02	4.710E+01	3.649E+02	4.710E+01	3.835E+01	1.086E+01	6.722E+01	1.689E+01						
		3	1.861E+02	3.610E+01	2.100E+02	3.779E+01	3.178E+02	4.600E+01	3.631E+02	4.691E+01	4.366E+01	9.991E+00	6.338E+01	1.539E+01						
		4	1.907E+02	3.492E+01	2.208E+02	3.898E+01	3.157E+02	4.400E+01	3.604E+02	4.899E+01	4.309E+01	8.765E+00	6.654E+01	1.501E+01						
		5	1.831E+02	3.860E+01	2.323E+02	4.104E+01	3.207E+02	4.572E+01	3.597E+02	4.450E+01	3.532E+01	6.051E+00	6.727E+01	1.227E+01						
AVE		1.895E+02	4.596E+01	2.210E+02	1.061E+03	3.192E+02	4.596E+01	3.614E+02	4.670E+01	3.950E+01	9.261E+00	6.661E+01	1.510E+01							
SD		6.671E+00	1.250E+00	8.148E+00	1.330E+00	2.362E+00	1.250E+00	2.596E+00	1.642E+00	3.700E+00	1.971E+00	1.826E+00	1.731E+00							
	40	1	8.208E+01	2.073E+01	3.018E+02	3.577E+01	1.428E+02	2.645E+01	2.018E+02	3.098E+01	2.378E+02	3.665E+01	4.459E+02	4.100E+01	3.689E+02	3.688E+01	4.079E+02	5.165E+01		
		2	7.855E+01	1.877E+01	3.039E+02	3.399E+01	1.447E+02	2.500E+01	1.976E+02	2.785E+01	2.311E+02	2.588E+01	4.417E+02	4.300E+01	3.658E+02	3.800E+01	4.049E+02	4.625E+01		
		3	7.681E+01	2.270E+01	3.050E+02	3.673E+01	1.486E+02	2.573E+01	1.987E+02	3.200E+01	2.327E+02	2.101E+01	4.408E+02	3.900E+01	3.752E+02	3.400E+01	4.179E+02	4.787E+01		
		4	8.278E+01	2.045E+01	3.008E+02	3.364E+01	1.459E+02	2.378E+01	2.049E+02	3.001E+01	2.388E+02	3.313E+01	4.491E+02	4.499E+01	3.788E+02	3.501E+01	4.139E+02	5.069E+01		
		5	7.963E+01	1.891E+01	3.014E+02	3.931E+01	1.407E+02	3.033E+01	1.972E+02	3.160E+01	2.300E+02	4.444E+01	4.544E+02	3.799E+01	3.661E+02	4.238E+01	4.093E+02	4.691E+01		
AVE		7.997E+01	2.626E+01	3.026E+02	3.589E+01	1.445E+02	2.626E+01	2.001E+02	3.049E+01	2.341E+02	3.232E+01	4.464E+02	4.120E+01	3.710E+02	3.725E+01	4.108E+02	4.867E+01			
SD		2.474E+00	2.484E+00	1.779E+00	2.299E+00	3.016E+00	2.484E+00	3.224E+00	1.657E+00	3.980E+00	9.160E+00	5.591E+00	2.863E+00	5.772E+00	3.263E+00	5.128E+00	2.374E+00			
	50	1	8.590E+01	1.458E+01	1.788E+02	2.289E+01	1.856E+02	2.356E+01	2.591E+02	2.474E+01	3.241E+02	2.489E+01	3.988E+02	2.878E+01	4.489E+02	3.001E+01				
		2	8.641E+01	1.672E+01	1.756E+02	2.078E+01	1.900E+02	2.401E+01	2.581E+02	2.294E+01	3.261E+02	2.303E+01	4.040E+02	2.701E+01	4.507E+02	3.101E+01				
		3	8.208E+01	1.411E+01	1.791E+02	2.389E+01	1.871E+02	2.355E+01	2.590E+02	2.600E+01	3.191E+02	2.733E+01	4.068E+02	3.069E+01	4.421E+02	2.888E+01				
		4	8.073E+01	1.257E+01	1.731E+02	2.034E+01	1.830E+02	2.220E+01	2.641E+02	2.784E+01	3.186E+02	2.649E+01	4.008E+02	3.069E+01	4.459E+02	3.099E+01				
		5	8.289E+01	1.197E+01	1.745E+02	2.545E+01	1.938E+02	2.884E+01	2.680E+02	2.559E+01	3.122E+02	3.017E+01	3.896E+02	2.495E+01	4.386E+02	2.419E+01				
AVE		8.360E+01	1.399E+01	1.762E+02	2.267E+01	1.879E+02	2.442E+01	2.617E+02	2.542E+01	3.200E+02	2.642E+01	4.000E+02	2.842E+01	4.453E+02	2.902E+01					
SD		2.462E+00	1.866E+00	2.659E+00	2.137E+00	4.174E+00	2.553E+00	4.233E+00	1.792E+00	5.427E+00	2.701E+00	6.554E+00	2.473E+00	4.932E+00	2.834E+00					

Table F2 Raw data of the adsorption isotherm of NaY at 30, 40 and 50°C

Adsorbent	Temperature (°C)	Replicate	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent	Equilibrium conc. (ppm)	μmole of adsorbed DPM/g of adsorbent
NaY	30	1	1.131E+02	8.187E+00	2.377E+02	1.877E+01	2.787E+02	1.099E+01	3.897E+02	1.876E+01	3.459E+02	2.293E+01	5.907E+02	1.874E+01	1.131E+02	8.187E+00	2.377E+02	1.877E+01
		2	1.097E+02	9.188E+00	2.280E+02	1.789E+01	2.850E+02	1.586E+01	3.908E+02	1.890E+01	3.549E+02	1.301E+01	5.883E+02	1.088E+01	1.097E+02	9.188E+00	2.280E+02	1.789E+01
		3	1.069E+02	6.235E+00	2.300E+02	1.001E+01	2.760E+02	1.810E+01	3.950E+02	2.099E+01	3.439E+02	2.012E+01	6.026E+02	2.579E+01	1.069E+02	6.235E+00	2.300E+02	1.001E+01
		4	1.006E+02	7.133E+00	2.381E+02	1.968E+01	2.898E+02	2.098E+01	3.907E+02	2.578E+01	3.481E+02	1.942E+01	5.837E+02	1.998E+01	1.006E+02	7.133E+00	2.381E+02	1.968E+01
		5	9.957E+01	8.986E+00	2.163E+02	1.151E+00	2.705E+02	9.278E+00	4.023E+02	5.777E+00	3.513E+02	6.758E+00	5.922E+02	3.337E+01	9.957E+01	8.986E+00	2.163E+02	1.151E+00
	AVE		1.060E+02	1.504E+01	2.300E+02	1.350E+01	2.800E+02	1.504E+01	3.937E+02	1.804E+01	3.492E+02	1.645E+01	5.915E+02	2.175E+01	1.060E+02	1.504E+01	2.300E+02	1.350E+01
	SD		5.800E+00	4.873E+00	8.895E+00	7.902E+00	7.552E+00	4.873E+00	5.246E+00	7.420E+00	3.862E+00	6.519E+00	6.980E+00	8.390E+00	5.800E+00	4.873E+00	8.895E+00	7.902E+00
	40	1	1.209E+02	8.337E+00	2.171E+02	1.085E+01	2.981E+02	1.078E+01	4.831E+02	2.667E+01	4.006E+02	1.979E+01	1.209E+02	8.337E+00	2.171E+02	1.085E+01		
		2	1.229E+02	6.009E+00	2.190E+02	1.688E+01	2.969E+02	2.199E+01	4.821E+02	1.799E+01	4.099E+02	2.389E+01	1.229E+02	6.009E+00	2.190E+02	1.688E+01		
		3	1.189E+02	5.346E+00	2.150E+02	1.399E+01	3.038E+02	1.395E+01	4.907E+02	2.087E+01	4.088E+02	1.663E+01	1.189E+02	5.346E+00	2.150E+02	1.399E+01		
4		1.178E+02	8.672E+00	2.208E+02	1.776E+01	3.008E+02	1.978E+01	4.809E+02	2.556E+01	3.985E+02	2.201E+01	1.178E+02	8.672E+00	2.208E+02	1.776E+01			
5		1.012E+02	8.305E+00	2.183E+02	5.456E+00	3.004E+02	1.347E+01	4.882E+02	3.894E+00	3.992E+02	1.267E+01	1.012E+02	8.305E+00	2.183E+02	5.456E+00			
AVE		1.164E+02	1.600E+01	2.180E+02	1.300E+01	3.000E+02	1.600E+01	4.850E+02	1.900E+01	4.034E+02	1.900E+01	1.164E+02	1.600E+01	2.180E+02	1.300E+01			
SD		8.667E+00	4.691E+00	2.145E+00	5.003E+00	2.671E+00	4.691E+00	4.234E+00	9.146E+00	5.490E+00	4.454E+00	8.667E+00	4.691E+00	2.145E+00	5.003E+00			
50	1	2.157E+01	3.917E+00	1.015E+02	3.878E+00	2.106E+02	1.112E+01	3.577E+02	1.563E+01	4.491E+02	2.034E+01	5.221E+02	2.239E+01	2.157E+01	3.917E+00	1.015E+02	3.878E+00	
	2	2.210E+01	4.109E+00	1.020E+02	1.354E+01	2.141E+02	1.078E+01	3.511E+02	1.483E+01	4.511E+02	1.988E+01	5.197E+02	1.200E+01	2.210E+01	4.109E+00	1.020E+02	1.354E+01	
	3	1.910E+01	5.183E+00	9.941E+01	6.998E+00	2.081E+02	1.299E+01	3.529E+02	2.400E+01	4.487E+02	1.599E+01	5.181E+02	2.499E+01	1.910E+01	5.183E+00	9.941E+01	6.998E+00	
	4	1.889E+01	4.619E+00	1.006E+02	1.001E+01	2.107E+02	1.292E+01	3.489E+02	2.287E+01	4.520E+02	2.199E+01	5.231E+02	2.412E+01	1.889E+01	4.619E+00	1.006E+02	1.001E+01	
	5	1.833E+01	1.108E+00	8.921E+01	4.514E+00	2.150E+02	1.922E+01	3.439E+02	2.398E+00	4.491E+02	2.027E+00	5.170E+02	4.219E+00	1.833E+01	1.108E+00	8.921E+01	4.514E+00	
	AVE		2.000E+01	3.787E+00	9.856E+01	7.787E+00	2.117E+02	1.340E+01	3.509E+02	1.595E+01	4.500E+02	1.605E+01	5.200E+02	1.755E+01	2.000E+01	3.787E+00	9.856E+01	7.787E+00
	SD		1.710E+00	1.576E+00	5.321E+00	4.019E+00	2.818E+00	3.403E+00	5.087E+00	8.628E+00	1.455E+00	8.140E+00	2.565E+00	9.090E+00	1.710E+00	1.576E+00	5.321E+00	4.019E+00

Appendix G Removal of Diphenylmercury from Heavy Naphtha in Small Pilot Unit 844

Table G1 Raw data of adsorption

NaX		NaY		CMG273	
Time (min)	Outlet Conc. (µg/l)	Time (min)	Outlet Conc. (µg/l)	Time (min)	Outlet Conc. (µg/l)
5	208.81	0	245.20	15	104.80
20	182.97	15	182.44	25	110.77
35	160.73	30	163.68	40	117.60
120	179.58	45	159.60	70	114.62
220	209.33	60	165.11	100	120.54
290	189.86	90	165.30	130	120.00
340	197.20	120	200.80	160	126.98
400	207.00	255	306.00	220	132.80
465	192.28	295	199.59	275	127.21
-	-	355	212.08	335	141.51
-	-	415	203.42	390	150.79
-	-	475	225.20	450	150.20

Table G2 Raw data of desorption

NaX		NaY		CMG273	
Time (min)	Outlet Conc. ($\mu\text{g/l}$)	Time (min)	Outlet Conc. ($\mu\text{g/l}$)	Time (min)	Outlet Conc. ($\mu\text{g/l}$)
15	37.29	15	106.79	25	22.23
30	17.15	30	90.56	40	15.00
45	16.02	45	70.23	70	14.58
60	15.75	60	59.67	100	12.14
90	14.26	90	56.38	130	9.97
120	14.06	120	18.66	155	10.62
180	20.52	180	15.92	275	11.22
240	13.04	250	14.15	335	10.81
309	15.27	300	11.67	400	10.23
360	15.23	360	13.34	480	12.09
420	20.51	450	11.00	-	-
480	13.75	490	11.04	-	-

Appendix H Removal of Diphenylmercury from Real Condensate in Small Pilot Unit 844

Table H1 Raw data of blank test on SiC

Adsorption		Desorption	
Time (min)	Outlet conc. ($\mu\text{g/l}$)	Time (min)	Outlet Conc. ($\mu\text{g/l}$)
0	90.51	0	54.92
60	170.02	60	0.43
120	154.66	120	0.36
180	175.54	180	1.01
240	165.98	240	0.56
300	172.27	-	-
360	164.55	-	-
420	155.25	-	-
480	180.81	-	-

Table H2 Raw data of adsorption

NaX		NaY		CMG273	
Time (min)	Outlet Conc. ($\mu\text{g/l}$)	Time (min)	Outlet Conc. ($\mu\text{g/l}$)	Time (min)	Outlet Conc. ($\mu\text{g/l}$)
30	1670.00	15	1507.00	20	1994.00
45	1788.00	35	1788.00	35	2073.00
60	1855.00	45	1857.00	50	2088.00
90	1945.00	60	1985.00	80	2119.00
110	2108.00	160	2007.00	155	2239.00
170	2115.00	250	2087.00	243	2114.00
235	1997.00	348	2244.00	285	2387.00
295	2003.00	473	2048.00	345	2098.00
355	2222.00	60	1507.00	410	2146.00
420	2023.00	160	1788.00	460	2520.00

Table H3 Raw data of desorption

NaX		NaY		CMG273	
Time (min)	Outlet Conc. ($\mu\text{g/l}$)	Time (min)	Outlet Conc. ($\mu\text{g/l}$)	Time (min)	Outlet Conc. ($\mu\text{g/l}$)
15	2301.00	20	1445.00	15	1076.00
35	1201.00	30	1223.00	30	188.00
45	937.00	45	1174.00	45	25.19
75	382.00	85	24.11	75	1.70
105	100.00	135	18.66	105	1.10
150	18.61	280	17.93	150	0.00
220	17.78	355	17.36	230	1.90
280	19.62	505	16.39	275	0.40
360	18.63	-	-	345	0.00
465	14.07	-	-	390	1.00

Appendix I Linear Correlations of Langmuir Adsorption Model

The original Langmuir adsorption model is shown below:

$$q = \left(\frac{bC}{1 + bC} \right) q_{\max}$$

Where:

q is the quantity of molecules adsorbed on the solid (mol/m^2 or mol/g of adsorbent), b is adsorption constant, q_{\max} is maximum capacity (mol/m^2 or mol/g of adsorbent) and C is equilibrium concentration (mole/l)

The equation can be rearranged to linear form by

Multiply both sides of the equation with C

$$\frac{q}{q_{\max}} = \frac{bC/C}{1/C + bC/C}$$

$$\frac{q}{q_{\max}} = \frac{b}{1/C + b}$$

$$\frac{1}{q} = \frac{1}{bCq_{\max}} + \frac{b}{bq_{\max}}$$

Therefore:

$$\frac{1}{q} = \left(\frac{1}{bq_{\max}} \right) \frac{1}{C} + \frac{1}{q_{\max}}$$

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