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Fig. 1

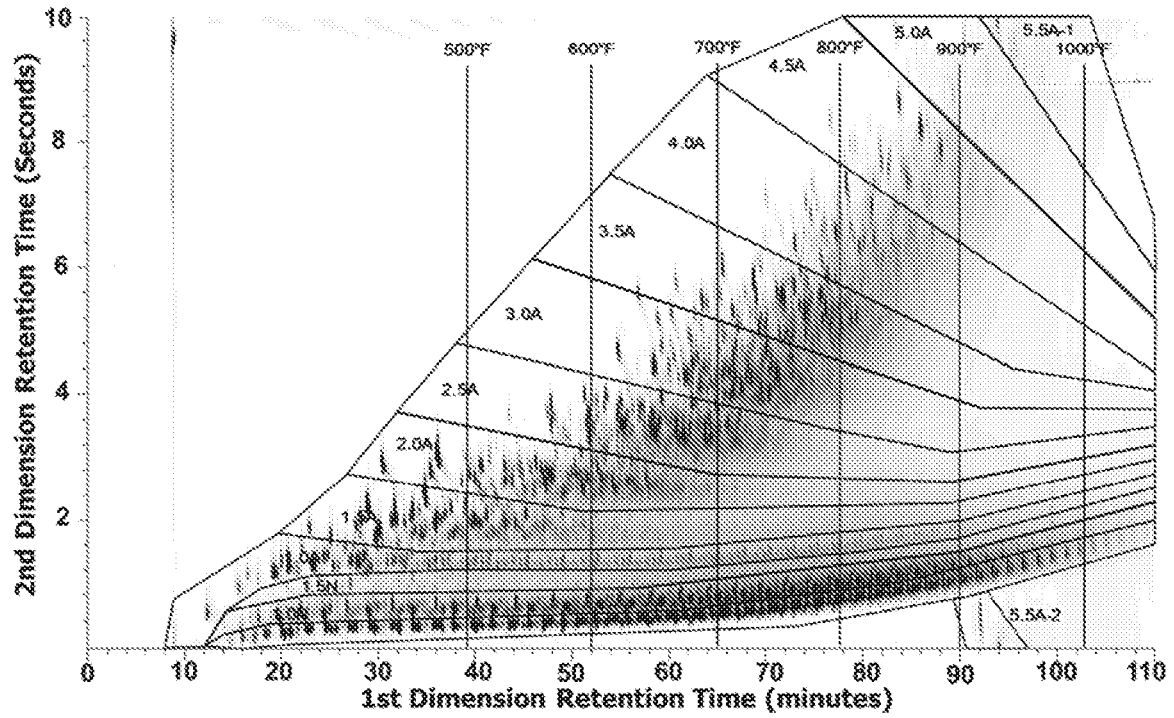


Fig. 2

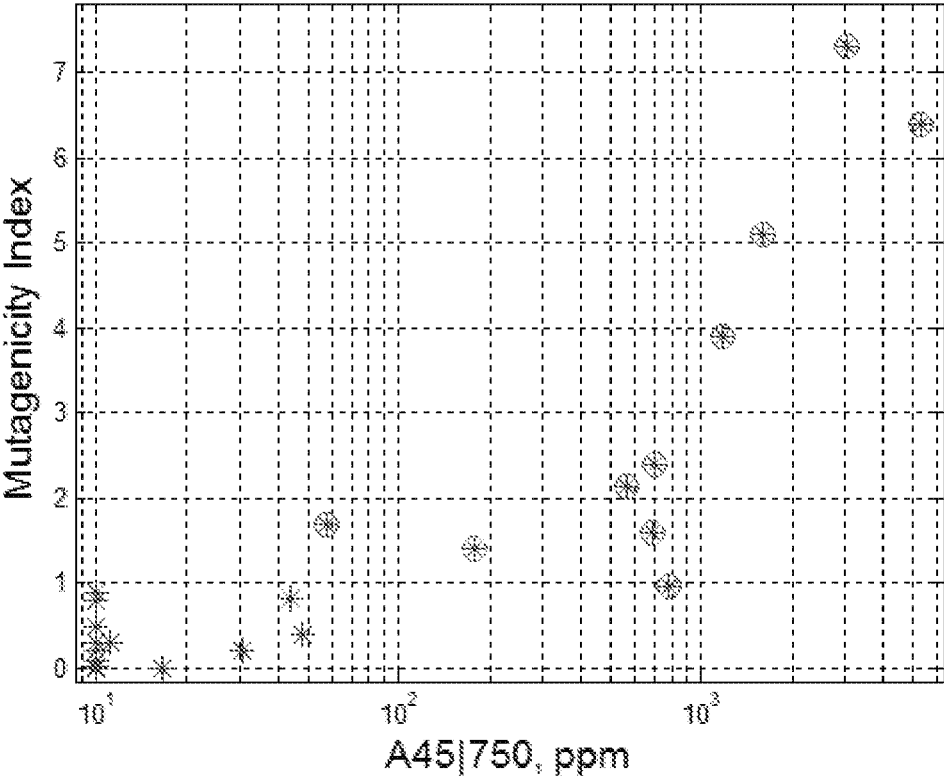
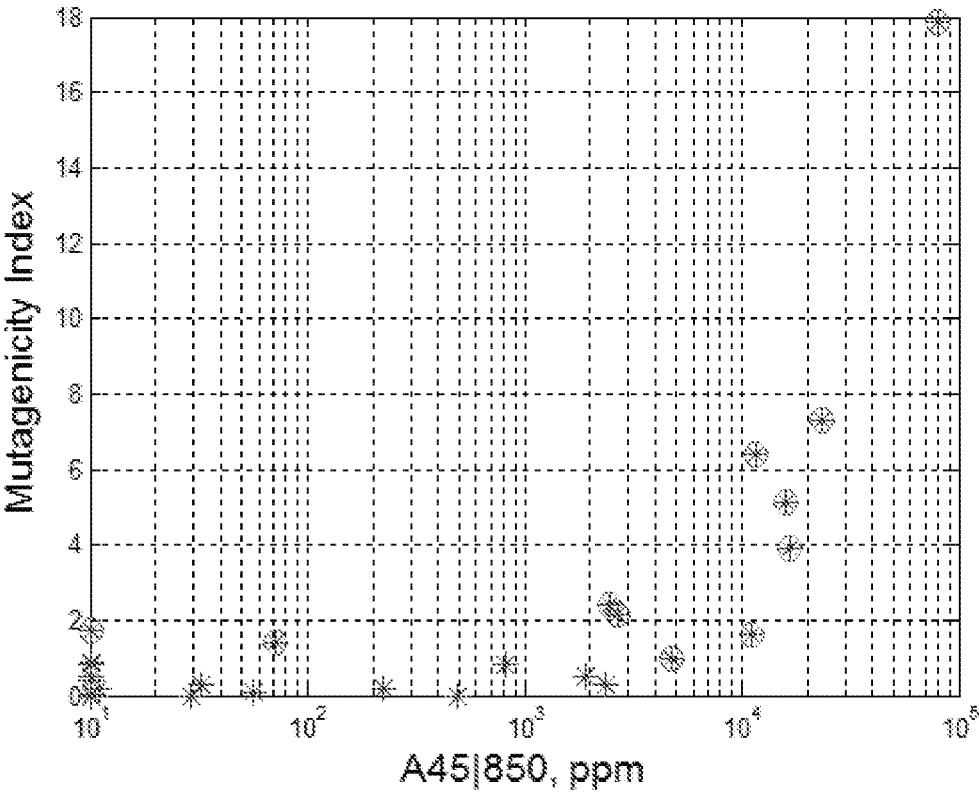


Fig. 3



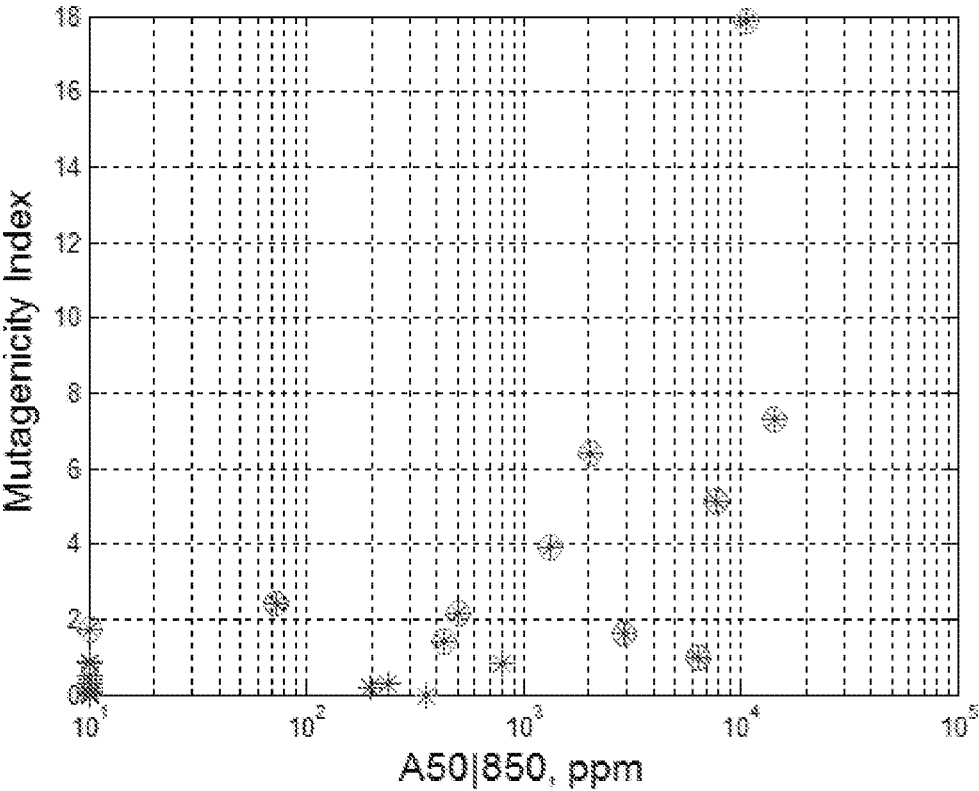


Figure 4

Fig. 5

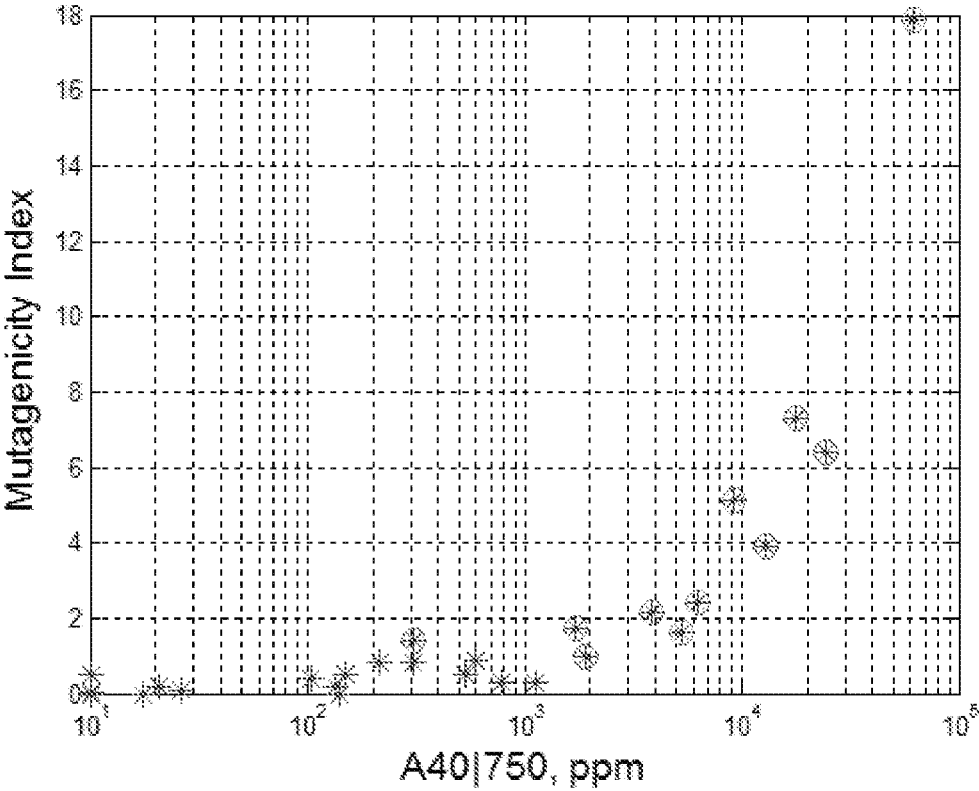


Fig. 6

Sample Number	Sample Description	700°F-800°F					800°F-900°F					MI
		3.5-Ring-ARO	4.0-Ring-ARO	4.5-Ring-ARO	5.0-Ring-ARO	5.5-Ring-ARO	3.5-Ring-ARO	4.0-Ring-ARO	4.5-Ring-ARO	5.0-Ring-ARO	5.5-Ring-ARO	
15-106926	Catalytic base oil	1,448	215	44	-	-	7,834	2,073	809	793	292	0.82
15-107696	Catalytic base oil	4,241	1,913	783	53	-	11,832	5,955	4,730	6,451	2,090	0.97
15-78783	Catalytic base oil	1,085	1	-	-	-	5,108	717	29	8	-	0
15-80972	Catalytic base oil	710	135	31	1	-	3,737	488	222	195	13	0.2
15-93588	Catalytic base oil	1,070	141	17	-	-	6,897	1,231	488	359	16	0
01-058031	raffinate	2,403	18	-	-	-	20,910	1,209	1	-	-	0
01-058032	raffinate	2,452	21	-	-	-	22,423	1,546	11	-	-	0.2
01-058033	raffinate	3,786	26	-	-	-	28,504	2,723	57	-	-	0.1
01-058724	Group I base oil	25,204	5,298	691	0	-	54,617	19,367	11,220	2,923	-	1.6
01-060457	Light distillate	3,781	308	-	-	-	7	0	-	-	-	0.8
01-061614	Light distillate	127	104	48	-	-	-	1	0	1	-	0.4
01-58725	raffinate	8,814	1,127	11	-	-	29,003	8,577	2,377	239	-	0.3
02-001458	Light distillate	21,887	1,730	58	-	-	-	-	-	-	-	1.7
02-009054	Heavy distillate	1,919	149	-	-	-	-	-	-	-	-	0.5
02-030765	Heavy distillate	32,017	9,121	1,605	3	-	41,445	23,963	15,988	7,829	91	5.1
03-017911	Light distillate	12,061	533	5	-	-	-	-	-	-	-	0.5
03-022831	Hydrocracker bottoms	295	307	178	0	-	1,414	7	72	434	24	1.4
03-031229	Heavy distillate (VGO)	48,516	17,617	3,043	86	-	46,048	29,305	23,132	14,470	266	7.3
97-014945	Heavy distillate (VGO)	70,945	24,420	5,296	10	-	17,385	12,718	11,638	2,050	0	6.4
98-040147	Raffinate	30,031	6,231	707	-	-	13,034	5,578	2,476	73	-	2.4
01-054888	Heavy distillate (VGO)	2,487	600	7	2	0	1	0	1	1	1	0.9
13-061950	Catalytic base oil	421	-	-	-	-	7,123	606	-	-	-	0.02
13-100974	Group I base oil	367	-	-	-	-	10,473	1,842	1	-	-	0
13-042773	Heavy distillate	7,748	3,884	567	-	-	12,463	7,367	2,711	499	13	2.14
02-002341	Raffinate	5,381	785	1	-	-	9,337	4,243	33	-	-	0.3
13-092960	Heavy distillate	28,810	12,809	1,187	-	-	35,986	37,594	16,746	1,344	1	3.9
02-002329	Extract	101,628	62,413	10,106	1	-	65,717	100,368	79,265	10,747	326	17.86
02-002344	Heavy raffinate	1	-	-	-	-	15,080	7,273	1,915	2	-	0.5

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Fig. 7

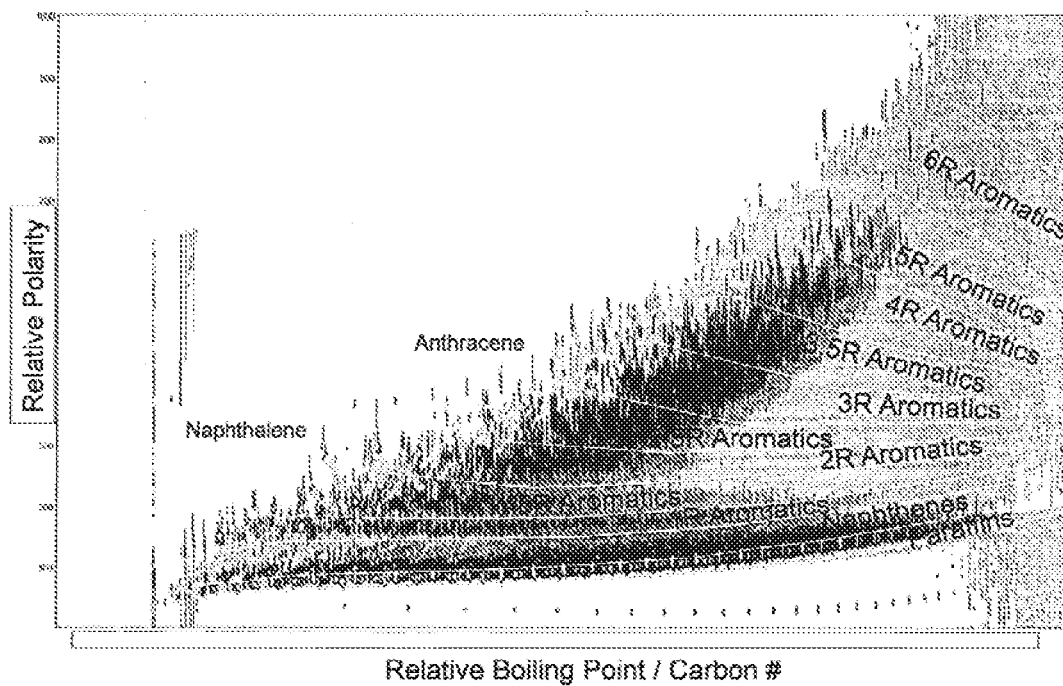
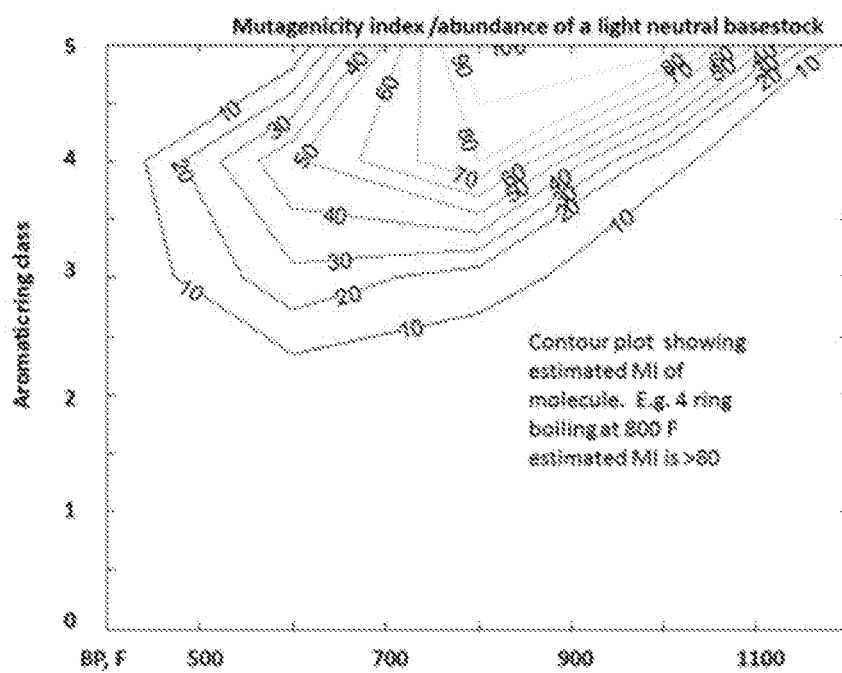
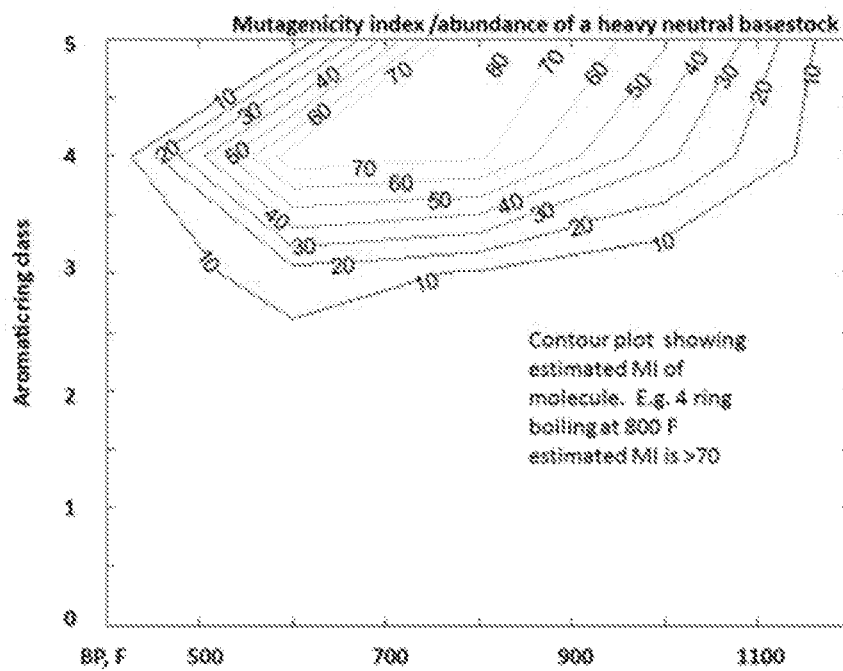


Fig. 8



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Fig. 9



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Fig 10

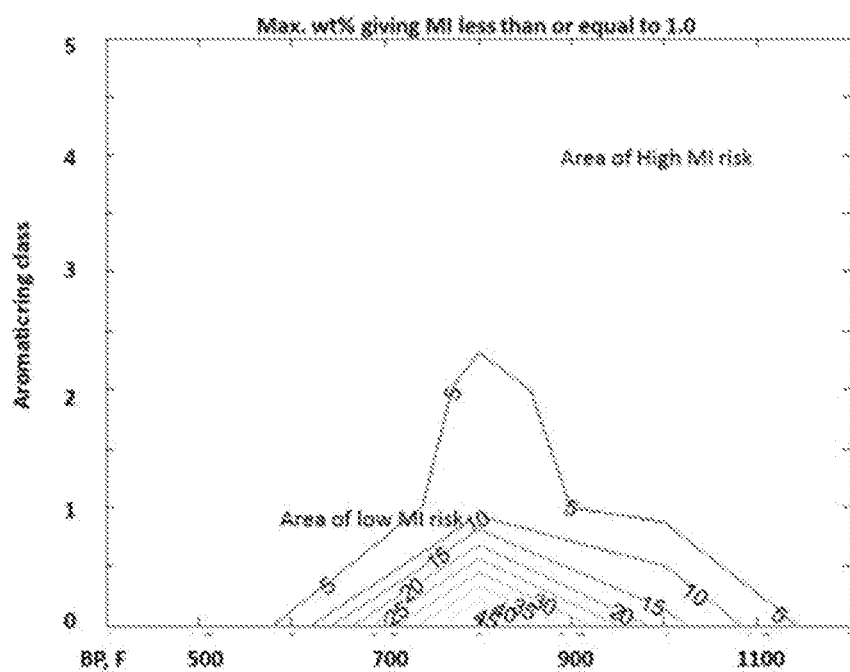
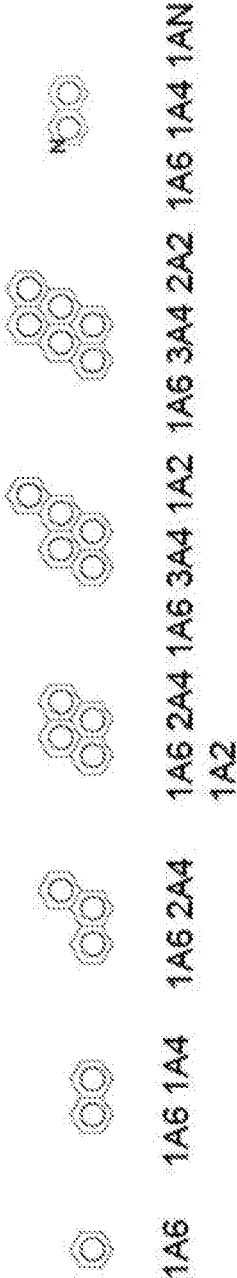


Fig 11

Functional form for computing MI from compositions

$$MI = k \sum_{i=1}^N \frac{K_{A_i} C_i}{1 + \sum_{j=1}^N K_{A_j} C_j}$$



The equation relating the adsorption constant K_{A_i} to the number of each type of SOL increments takes the following empirical form:

$$\ln K_{A_i} = aA4 + bA2 + cAN$$

Coefficient	Value
Effective rate constant, k	11607.4
Adsorption constant coefficient (A4), a	7.020
Adsorption constant coefficient (A2), b	1.819
Adsorption constant coefficient (AN), c	1.317