



Results of Low Temperature Refining of Coal Material to Achieve Energy Efficient Electrical Cracking Technology.

TEST PROTOCOL Purpose of the test: Determination of organic compounds in a liquid sample. Sample name: Sample No. 1. Analysis methods: gas chromatography with mass spectrometric detection (Agilent 6890N / 5973N). Analysis conditions: sample volume 1 μ l, sample injection temperature 250 ° C, flow division 10: 1. Separation was carried out using a DB-35MS chromatographic capillary column with a length of 30 m, an inner diameter of 0.25 mm, and a film thickness of 0.25 μ m at a constant carrier gas (helium) velocity of 1 ml / min. The chromatographic temperature is programmed from 40 ° C (exposure 5 min) to 200 ° C with a heating rate of 10 ° C / min (exposure 10 min). Detection is carried out in the SCAN m/ z34-800 mode. For management. Agilent MSD Chem Station software (version 1701EA) was used for the gas chromatography system, registration and processing of the obtained results and data. Data processing included determination of retention times, peak areas, as well as processing, spectral information obtained using a mass spectrometric detector. The Wiley 7th edition and NIST'02 libraries were used to decode the obtained mass spectra (the total number of spectra in the libraries is more than 550 thousand).

Test results Table 1.
Results of chromatographic analysis of sample No. 1

No	Retention time, minutes	Percentage %	Compounds
1	7,50	0,45	p-Xylene
2	8,26	0,16	Benzene, 1,3-dimethyl-
3	8,53	0,06	Bicyclo[4.2.0]octa-1,3,5-triene
4	8,91	0,14	Decane
5	9,03	0,04	1-Decene
6	9,54	0,03	Benzene, propyl-
7	9,78	0,33	Benzene, 1-ethyl-4-methyl-
8	10,28	0,11	Benzene, 1-ethyl-4-methyl-
9	10,55	0,48	Benzene, 1,2,3-trimethyl-
10	10,84	0,14	Benzene, 1-propenyl-
11	10,93	0,17	Benzene, 1-ethenyl-2-methyl-
12	11,00	0,38	Undecane
13	11,10	0,17	1-Undecene
14	11,29	0,21	Mesitylene

60	16,41	0,71	Pentadecane, 2,6,10,14-tetramethyl-
61	16,52	0,56	Benzene, 1-(2-butenyl)-2,3-dimethyl-
62	16,56	0,20	Benzene, (1,3,3-trimethylnonyl)-
63	16,66	4,65	Naphthalene, 2-methyl-
64	17,12	1,15	Pentadecane
65	17,20	0,55	1-Pentadecene
66	17,38	0,48	Cyclohexanecarboxylic acid, pentadecyl ester
67	17,67	0,15	Benzene, 2-chloro-1,4-dimethyl-
68	17,85	0,75	5,8-Dimethyl-1,2,3,4-tetrahydro-1-naphthol
69	17,94	2,32	Biphenyl
70	18,06	0,19	2-Propanone, 1-(4-methoxyphenyl)-
71	18,37	2,26	Naphthalene, 2,6-dimethyl-
72	18,48	3,96	Naphthalene, 1,7-dimethyl-
73	18,61	0,66	Diphenylmethane
74	18,71	1,68	Naphthalene, 1,6-dimethyl-
75	18,93	0,34	Anisole, p-(1-ethylvinyl)-
76	19,01	0,65	Naphthalene, 1,4-dimethyl-
77	19,06	0,28	Benzyl alcohol, α -isobutyl-2,4,6-trimethyl-
78	19,13	0,51	Quinoline, 2,7-dimethyl-
79	19,26	2,98	1,1'-Biphenyl, 4-methyl-
80	19,36	1,17	Naphthalene, 2-(1-methylethyl)-
81	19,43	0,73	1,1'-Biphenyl, 2-methyl-
82	19,57	1,02	Heptadecane
83	19,65	0,89	Benzene, (2,4-cyclopentadien-1-ylidenemethyl)-
84	19,93	0,38	2,2'-Dimethylbiphenyl
85	20,00	2,35	Dibenzofuran
86	20,11	0,33	1,1'-Biphenyl, 2-methyl-
87	20,18	0,22	2,2,7,7-Tetramethyltricyclo[6.2.1.0(1,6)]undec-4-en-3-one
88	20,26	1,55	Naphthalene, 2,3,6-trimethyl-
89	20,31	0,33	4-Ethylbiphenyl
90	20,45	0,87	1,1'-Biphenyl, 2-ethyl-
91	20,50	0,53	4,4'-Dimethylbiphenyl
92	20,70	2,25	Naphthalene, 1,6,7-trimethyl-
93	20,78	0,52	1-Octadecene
94	20,94	2,54	Fluorene
95	21,08	0,72	2,2'-Dimethylbiphenyl
96	21,39	2,58	9H-Xanthene
97	21,48	1,10	1,4,5,8-Tetramethylnaphthalene
98	21,64	1,84	2-Hydroxyfluorene
99	21,70	0,42	Chamazulene
100	21,85	1,16	Nonadecane
101	21,95	0,50	1-Tricosene
102	22,18	0,63	Phenol, 4-(2-phenylethenyl)-, (E)-
103	22,45	1,45	9H-Fluorene, 2-methyl-



15	11,54	0,20	Benzene, 1,3-diethyl-
16	11,63	0,09	Benzene, butyl-
17	11,74	0,25	Benzene, 2-ethyl-1,4-dimethyl-
18	11,78	0,18	Indane
19	11,91	0,10	Benzene, 1-methyl-3-propyl-
20	12,08	0,06	Undecane, 2-methyl-
21	12,13	0,14	Benzene, 1-ethyl-2,4-dimethyl-
22	12,22	0,87	Indene
23	12,38	0,13	Phenol, 2-methyl-
24	12,44	0,05	Benzene, 1-methyl-4-(1-methylethenyl)-
25	12,58	0,18	Indan, 1-methyl-
26	12,73	0,14	Benzene, 1-methyl-4-(2-propenyl)-
27	12,77	0,83	Dodecane
28	12,86	0,39	Cyclododecane
29	13,04	0,17	Benzene, 1,2,4,5-tetramethyl-
30	13,20	0,20	Benzene, 1,3-diethyl-5-methyl-
31	13,40	0,21	Benzene, pentyl-
32	13,60	0,46	Benzene, 1-methyl-2-(2-propenyl)-
33	13,70	0,40	Tetradecane
34	13,79	0,11	Benzene, 1-methyl-4-(1-methylpropyl)-
35	13,84	0,49	Benzene, 4-ethenyl-1,2-dimethyl-
36	14,03	1,01	2-Methylindene
37	14,14	0,24	2-Methylindene
38	14,18	0,53	1,4-Dihydronaphthalene
39	14,24	0,26	3,4-Dimethylcumene
40	14,34	1,20	Tridecane
41	14,42	0,60	1-Tridecene
42	14,71	0,15	2-Phenylpent-4-enol
43	14,89	0,28	1H-Indazole, 5,7-dimethyl-
44	15,02	4,19	Naphthalene
45	15,11	0,36	2-Ethyl-2,3-dihydro-1H-indene
46	15,15	0,21	Bicyclo[4.2.1]nona-2,4,7-triene, 7-ethyl-
47	15,23	0,17	1H-Benzimidazole, 5,6-dimethyl-
48	15,26	0,15	Dodecane, 2,6,10-trimethyl-
49	15,38	0,26	1H-Indene, 2,3-dihydro-4,7-dimethyl-
50	15,44	0,27	Phenol, 2-ethyl-4-methyl-
51	15,50	0,21	2-Phenyl-4-penten-2-ol
52	15,62	0,37	1H-Indene, 2,3-dihydro-4,7-dimethyl-
53	15,69	0,21	Phenol, 4-propyl-
54	15,73	0,22	1H-Indene, 4,7-dimethyl-
55	15,78	1,41	Tetradecane
56	15,87	0,55	Cyclohexanecarboxylic acid, tetradecyl ester
57	15,97	0,26	1H-Indene, 2,3-dihydro-4,7-dimethyl-
58	16,07	0,47	Oxalic acid, hexyl 2-isopropylphenyl ester
59	16,35	0,65	1H-Indene, 1,1-dimethyl-



104	22,60	1,62	9H-Fluorene, 3-methyl-
105	22,78	1,28	Naphtho[2,1-b]furan, 1,2-dimethyl-
106	23,30	1,66	Eicosane
107	23,78	0,28	Phenol, 4-(2-phenylethenyl)-
108	23,98	0,95	Benzo[c]cinnoline, 4-methoxy-
109	24,12	0,22	Naphthalene, 1,2,3-trimethyl-4-propenyl-, (E)-
110	24,38	0,58	4-Phenanthrenol, 1,2,3,4-tetrahydro-4-methyl-
111	24,64	3,91	Phenanthrene
112	24,73	0,36	Benzene, 1-methoxy-3-(2-phenylethenyl)-, (E)-
113	24,83	1,61	Anthracene
114	25,24	0,68	Heneicosane
115	25,42	0,46	1,1'-Biphenyl, 3,3',4,4'-tetramethyl-
116	25,55	0,39	Benzo[h]quinoline
117	25,63	0,37	Phenanthrene, 9,10-dihydro-1-methyl-
118	26,00	0,96	1H-Indene, 1-(phenylmethylene)-
119	26,59	0,79	1H-Indene, 2,3-dihydro-2-methoxy-1-phenyl-, cis-
120	26,86	1,96	Benzenamine, 4-nitroso-N-phenyl-
121	27,13	2,78	Phenanthrene, 2-methyl-
122	27,90	0,77	Docosane
123	28,10	0,78	Anthracene, 2-methyl-
124	28,46	1,71	Phenanthrene, 1-methyl-
125	29,37	0,32	Phenanthrene, 4,5-dimethyl-
126	29,89	1,14	Naphthalene, 2-phenyl-
127	30,16	0,54	Acetamide, N-9H-fluoren-2-yl-N-hydroxy-

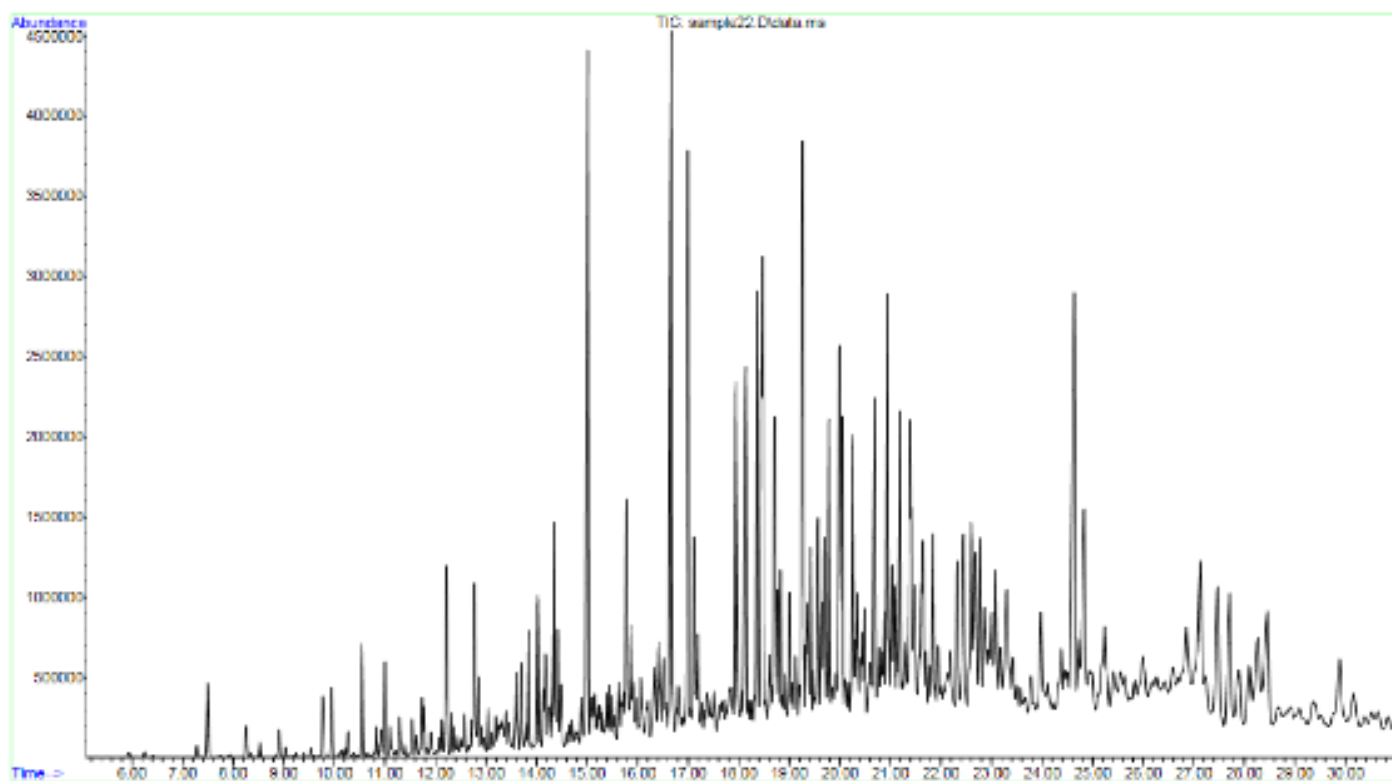


Figure 1 - Chromatogram No. 1 of the sample