Synthesis and Characterization of Polychlorinated Naphthalenes. III. Gas Chromatography

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The aim of present article is to report GC relative retention times (RRT) and ECD response factors (F) of various Polychlorinated Naphthalenes (PCNs). The work on synthesis of pure isomers was started at Carleton University few years ago and continued in St.Petersburg University. By the time it resulted in synthesis of 37 isomers with different number of chlorines in a molecule[1,2]. Synthetic methods, developed in course of this project allow to prepare any specific isomer, if a need in such standard happened.

Retention times of 34 PCNs were determined on Varian SATURN II GC/MS system, on 30m DB-5 column. ECD response factors (and RRT) of 14 PCN congeners from the first commercial set of standard solutions were determined on Zvet-3700 Gas Chromatograph on Russian-made 25m SE-52 column (2mkl of 100mkg/L solution per injection). The results are listed in Table 1. Figure 1 shows a chromatogram of 2mkl of mixed solution, containing 100mkg/L of each PCN.

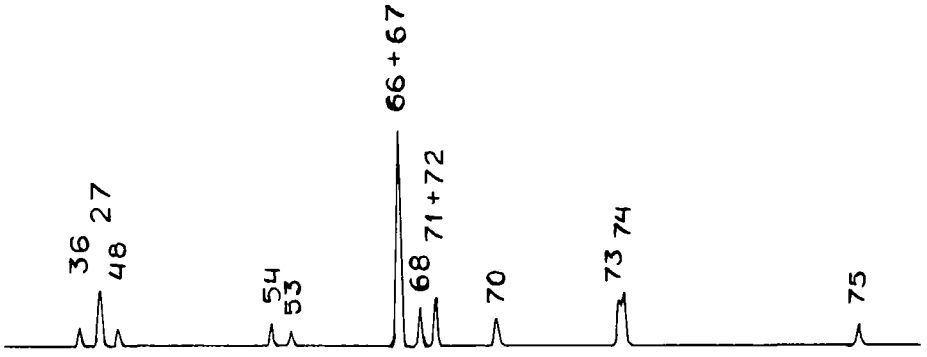

Fig. 1. A mixture of 14 PCNs.

References :

1) V. Nikiforov, P. Auger, R. Wightman, M. Malaiyandi and D. Williams (1992): Synthesis and Characterization of Polychlorinated Naphthalenes. Organohalogen Compounds. V. 8, pp..123-124

2) V. Nikiforov, V. Karavan, S. Miltsov and V. Tribulovich (1993): Synthesis and Characterization of Polychlorinated naphthalenes. II. Laterally Substituted Congeners. Organohalogen Compounds. V. 14, pp.. 229-230.

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Syst. Number	Structure	GC/MS RRT	GC/ECD RRT	F
6	1,5-DCN	0.549		
11	2,6-DCN	0.552		
13	1,2,3-TrCN	0.788		
23	1,4,5-TrCN	0.813		
26	2,3,6-TrCN	0.776		
27	1,2,3,4-TeCN	0.98	0.985	1.98
28	1,2,3,5-TeCN	0.964		
31	1,2,3,8-TeCN	1.06		
34	1,2,4,7-TeCN	0.912		
36	1,2,5,6-TeCN	0.957	0.968	0.87
46	1,4,5,8-TeCN	1.05		
48	2,3,6,7-TeCN	1	1	1
49	1,2,3,4,5-PeCN	1.227		
50	1,2,3,4,6-PeCN	1.148		
52	1,2,3,5,7-PeCN	1.104		
53	1,2,3,5,8-PeCN	1.199	1.145	0.56
54	1,2,3,6,7-PeCN		1.127	1.11
55	1,2,3,6,8-PeCN	1.199		
56	1,2,3,7,8-PeCN	1.265		
57	1,2,4,5,6-PeCN	1.182		
59	1,2,4,5,8-PeCN	1.216		
60	1,2,4,6,7-PeCN	1.106		
63	1,2,3,4,5,6-HxCN	1.407		
64	1,2,3,4,5,7-HxCN	1.348		
65	1,2,3,4,5,8-HxCN	1.421		
66	1,2,3,4,6,7-HxCN	1.325	1.236	3.09
67	1,2,3,5,6,7-HxCN	1.323	1.235	1.98
68	1,2,3,5,6,8-HxCN	1.348	1.254	1.34
69	1,2,3,5,7,8-HxCN	1.358		
70	1,2,3,6,7,8-HxCN	1.427	1.316	1.32
71	1,2,4,5,6,8-HxCN	1.367	1.266	0.6
72	1,2,4,5,7,8-HxCN	1.368	1.268	0.78
73	1,2,3,4,5,6,7-HpCN	1.559	1.419	2.18
74	1,2,3,4,5,6,8-HpCN	1.559	1.425	2.56
75	OctaCN	1.786	1.629	1.19