Physical Chemistry
Special Study 70-31
Job No. 9799022

AROCLOR 5460 PROCESS ANALYSES

INTRODUCTION

In order to gain insight into the source of high polychlorinated biphenyls (PCB) in occasional lots of production Aroclor 5460, five sets of samples were taken from the process in March and April, 1970.

These samples consisted of the Santowax R going into the chlorination, the corresponding Aroclor 5060 resulting from the chlorination and the corresponding Aroclor 5460 produced by distillation of the 5060. The Santowax R samples were analyzed for biphenyl content and the 5060 and 5460 samples were analyzed for total PCB.

RESULTS

The Santowax R samples were analyzed for biphenyl by conventional gas chromatography using a 1/8" O.D. X 2 meter column of 10% SE-52 silicone gum rubber on High Performance Chromosorb W at 170°C with flame ionization detection and 0.4% naphthalene added as internal standard. The Aroclor 5060 and 5460 samples were analyzed by carbon skeleton chromatography using Physical Chemistry Method 70-15. This procedure also gives a measure of the total quatraphenyls + higher polyphenyls.

The results of the analyses are given in the attached table. All samples are identified by the batch and set numbers given on the sample cans. Each batch of Santowax 5060 had a corresponding Santowax R sample with the same batch number. Apparently the Aroclor 5460 from each set was produced by combining two batches of Santowax 5060.

DISCUSSION OF RESULTS

The biphenyl analyses on the Santowax R batches going into the chlorination do not correlate with the PCB content of the corresponding Aroclor 5060 batches before distillation. The results in Set No. 2 are very interesting. The Aroclor 5460 product contains a higher level of PCB (1.8%). This was apparently produced from a normal batch (#65) of 5060 containing 0.43% PCB and a very abnormal batch (#66) of 5060 containing 3.3% PCB. However, the Santowax R going into batch #66 contains the usual level (0.71%) of biphenyl.

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The lack of consistency between the biphenyl content of the Santowax R and the corresponding Aroclor 5060 is very perplexing.

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Aroclor 5460 Process Analyses

PHYSICAL CHEMISTRY SPECIAL STUDY 70-31

Concentration in Weight %

	Set* 1 (3-27-70)					Set* 2 (3-28-70)					Set* 3 (4-2-70)				
	Ba*63		Ba*64		Ba*56	Ba*65		Ba*66		–	Ba*71		Ba*73		Ba*60
	R	5060	R	5060	5460	R	5060	R	5060	5460	R	5060	R	5060	5460
Biphenyl	0.69		0.81			0.80		0.71			0.73		0.70		
PCB		0.32		0.42	0.38		0.43		3.3	1.8		0.24		0.24	0.34
Quatraphenyls +		6.1		5.8	3.6		6.4		7.7	3.3		7.8		6.9	3.7

	Set* 4 (4-7-70)					Set* 5 (4-8-70)				
	Ba*11		Ba*12		–	Ba*13		Ba*14		–
	R	5060	R	5060	5460	R	5060	R	5060	5460
Biphenyl	0.99		0.97			0.96		1.08		
PCB		0.40		0.47	0.42		0.39		0.41	0.48
Quatraphenyls +		7.7		5.9	3.9		9.5		7.4	5.0

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