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APPLIED SCIENCES SECTION

March, 1969

This report summarizes, by business group, work carried out by the following personnel in the Applied Sciences Section.

Physical Chemistry	Analytical Chemistry	Spectroscopy	Instrument Research
E. M. Emery		M. W. Dietrich	L. Fowler
G. M. Gasser	C. H. Brackbill	B. Katlafsky	A. J. Bindbeutel
H. W. Luebke	F. M. Grogan	T. J. Furdek	J. G. Converse
R. L. McKinley	O. Hicks	D. Guerry	A. L. Manno
W. M. Mees	D. B. Hines	O. E. Kinast	W. N. Trump
V. W. Saeger	W. J. Litschgi	J. P. Mieure	
C. E. Vogler	E. S. Tucker	H. Yepez	
B. J. Westenberger		M. Manley (part time)	

Computer Technology	Statistics	Secretary
R. F. Brooks	J. D. Hinchen	D. L. Bivin

CELLU-CHEM

2,4-Diaminochlorobenzene: Laboratory prepared material was analyzed by GC to determine purity. Inconsistent results obtained earlier seem to be caused by water in the samples which limits the solubility of the 3,4'-dichlorodiphenylether internal standard. A 1:1 mixture of methanol and benzene was found to be a better solvent for the analysis.

PB-702: An IBM 1130 computer program has been written to handle the data reduction in E/VCl solubility and hydrogen bonding parameter evaluations. The output is presented digitally and graphically.

Computer programs for gel permeation chromatography and particle size data reductions have been converted to the new IBM 1130 configuration and operating system. An operational procedure is being established to efficiently handle this work in our Creve Coeur laboratories.

An experimental design to screen 7 operating variables in 8 runs was set up to study variables contributing to operating smoothness and economics. Regression analysis was used to point out the critical variables.

Non-Woven Binder: An experimental design was provided to help determine the effect of resins, substrates, fillers and plasticizers on non-woven binder systems made up with Monsanto candidates and competitive products. A modified Simplex design in two blocks followed by a factorial design was the approach used.

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FINE CHEMICALS (Continued)

Benzyl Salicylate: Thermal stability experiments were run with crude and distilled benzyl salicylate and a distillation residue to assess the hazards involved in a plant demonstration. Only very minor amounts of decomposition from the crude and distilled products up to 300°C were observed in DSC measurements. The residue evolves significant amounts of gas above about 200°C. Rates have been calculated from pressure DTA data. The decomposition is primarily a decarboxylation reaction.

FUNCTIONAL FLUIDS

Aroclor Environmental Studies: A major effort is continuing on the development and application of GC/mass techniques for measurement of ppm chlorinated biphenyls in living systems. Initial Aroclor chicken and rat feeding studies have been completed at Biotest. Tissues for analysis have been received.

Analysis data for Anniston Snow Creek water and sediment samples show ppb and percentage levels of chlorinated biphenyls respectively. Mississippi water from the St. Louis area is currently under study.

Incineration experiments with NCR paper indicates that Aroclor is easily volatilized and undergoes little decomposition.

Early work on the catalytic reduction of Aroclor to bicyclohexyl with a Beroza unit prior to GC analysis looks promising. It is hoped that this technique will resolve the isomer and quantification problems.

Aroclor Dielectrics: A literature search covering stabilization of chlorinated fluids and polymers has been essentially completed. This project is aimed at blending new stabilizer additives or combinations thereof for use in Aroclor dielectric fluids. Experimental work is being done on the purification of epoxide scavengers. These epoxides are being tested for HCl scavenging efficiency in Aroclor 1242 and in most cases, require upgrading of electrical properties before meaningful tests can be carried out.

Aroclor 1242: Mass spectroscopy was used to identify the major isomeric components in current WGK Aroclor 1242 which were separated by gas chromatography.

GC analyses continue to be made in support of the study on gases produced when Aroclor 1242 is electrically sparked in transformers.

Aroclor 1232: GC analysis of Aroclor 1232 samples treated with molecular sieves at elevated temperatures indicated that a more selective removal of the 4,4'-dichlorobiphenyl isomer was not achieved.

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