

THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

DEVELOPMENT OF A MANUFACTURING PROCEDURE FOR LOW-LITHIUM,
LOW-URANIUM CONTENT FILTER PAPER

Project 3101-1

Report Fifteen

A Status Report

to

DEPARTMENT OF THE AIR FORCE
1155th TECHNICAL OPERATIONS SQUADRON (HQ. COMD.)
McCLELLAN AFB, CALIFORNIA

November 15, 1974

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DEVELOPMENT OF A MANUFACTURING PROCEDURE FOR LOW-LITHIUM,
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SUMMARY

This is Report Fifteen, a status report on Project 3101 under contract No. F08608-75-C-0009. In accord with the provisions of the contract, a consultation visit to Knowlton Brothers, Watertown, N. Y., in August was substituted for the status report due otherwise on August 31, 1974.

Previous work with Sample No. 3101-350 had indicated that purified IPC-1478 paper could be prepared with a lithium content of 2 ng/g. However, the current sample, No. 366, retained 4-8 ng Li/g. This is in excess of the useful levels for low-lithium paper. Further work is in progress to try to improve the purification process by repeating the cycle on two additional lots of paper.

A final report for the period July 1, 1973 to June 30, 1974, was submitted as Report Fourteen, dated September 30, 1974, for Project 3101 under Contract No. F08608-74-C-0016.

INTRODUCTION

A final report for the period July 1, 1973 to June 30, 1974 was submitted as Report Fourteen, dated September 30, 1974 for Project 3101 under Contract No. F08608-74-C-0016.

The current Contract No. F08608-75-C-0009 covers the period July 1, 1974 to June 30, 1975. The first bimonthly report was due on August 31, 1974, but under the provisions of the contract a consultation trip to Knowlton Brothers in August was substituted for the report.

This is Report Fifteen on Project 3101 and covers experimental work from July 1 to October 31, 1974.

DISCUSSION

Based on previous results described for the purification of 20-inch squares of Series N paper under Sample No. 350 (1), additional lots of Series N paper were purified by percolation. Kronisol was applied by a paint sprayer at the prescribed rate of 30% based on the weight of the untreated air-dry sheet. The data are summarized in Table I. Although the uranium content of the purified paper averaged approximately 0.1 ng/g, the lithium content remained at 4-8 ng/g. This level was rather unexpected since sample No. 350 (1) averaged 2 ng Li/g. Work is under way to lower the lithium in such purified paper by repeating the leaching cycle on subsequent lots.

The process water (Table I) was analyzed and found to contain approximately 0.02 ng Li/ml. This level of lithium would contribute < 1.0 ng Li/g to the finished paper, and therefore, is eliminated as a significant factor in the high lithium levels.

TABLE I

URANIUM AND LITHIUM CONTENTS OF PURIFIED, SERIES N,
 IPC-1478 PAPER^a

Sample No.	Uranium		Lithium,	Remarks
3101-	8/5	ng/g	ng/g	
A stack of 35 sheets of IPC-1478 paper, Series N, Roll 22, 20-inch squares was purified by leaching in two cycles with ammonium carbonate and hydrofluoric acid. Kronisol was added at the rate of 30% based on the untreated, air-dry paper.				
365-1	133	0.24	5.10	Dry ash of these samples was light gray-white in color
-2	130	0.14	2.49	
-3	123	0.53	4.95	
A stack of 120 sheets of IPC-1478 paper, Series N, 19-inch squares was purified in one cycle with ammonium carbonate and hydrofluoric acid. Kronisol was added as prescribed.				
366-1	133	0.11	5.42	} Dry ash of these samples was light brown in color
-2	137	0.21	3.69	
-3	138	0.20	3.70	
-4	141	0.20	3.95	
-5	135	0.19	3.83	
-6	122	0.12	6.71	
-7	137	0.092	5.66	
-8	128	0.090	5.16	
-9	140	0.089	5.79	
-10	133	0.088	7.22	
-11	138	0.095	7.74	
-12	(105)	(0.15)	8.52	
367	122	0.00063 ng/ml	0.022 ng/ml	Process water sample from IPC, Rm 1229

^aThese analytical data were received by letter dated November 6, 1974, from Jack Phelps to E. E. Dickey.

EXPERIMENTAL

IPC-1478 PAPER, SERIES N, FOR PURIFICATION

Eight rolls of the Series N paper, untreated with Kronisol, were received from McClellan AFB, in two packages, four rolls to a package. The individual rolls were numbered 11-1, 11-2, 11-3, 11-4, 11-5, 11-7, 11-8, and 11-9, respectively. Each roll was 38 inches in width and was cut by hand into approximately 124, 19-inch squares. The stack of squares from each roll was treated as a unit and weighed 3.84 kg (or 8.47 pounds).

366, 367. PURIFICATION OF SERIES N PAPER

The stack of 19-inch squares from Roll 11-8 was placed on a neoprene rubber mesh on a leaching platform and was leached by percolation in succession with the following solutions.

15 liters	0.1M hydrofluoric acid
15 liters	deionized water
15 liters	0.1M ammonium carbonate
15 liters	deionized water
15 liters	0.1M hydrofluoric acid
50 liters	deionized water.

The stack was pressed under a rubber sheet to a consistency of 20-25%, the sheets were separated into sets of 3 and 4, and dried on racks at room temperature in a stream of filtered air.

Kronisol was applied from a small paint sprayer at a rate of 30% based on the weight of the untreated, air-dry sheet.

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The finished paper was designated as Sample No. 366; a sample of the process water was designated as Sample No. 367.

The analytical data are summarized in Table I.

FUTURE WORK

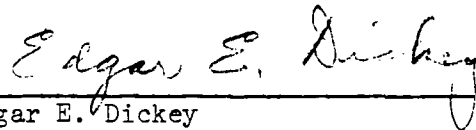
1. Work is in progress to process through a second purification cycle two lots of the 19-inch squares. This effort is designed to lower the lithium contents to more acceptable levels.

2. A 10-inch roll of Series N paper on an inert core (PVC) will be leached in two cycles to test the efficiency of the process on intact rolls. Analytical samples will be secured after each cycle.

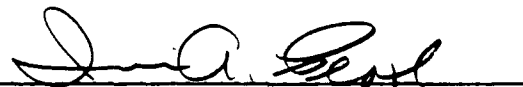
LITERATURE CITED

1. Project 3101, Report Fourteen, September 30, 1974, p. 22-5.

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