THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

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

Project 3101-1

Report Eighteen

A Status Report

to

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

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SUMMARY

Two lots, of 100 sheets each, of 19-inch squares of Series N paper were analyzed and were found to be satisfactory in uranium content (0.06-0.1 ng U/g) and uniform in lithium content (1.2 ng Li/g).

The collection and analysis of fines confirmed previous results and showed that fines of Series N paper retain lithium in a concentration approximately 10 times the lithium retained in the corresponding fiber.

Additional experiments are in progress to study the effects of capillary movement of reagents and of leaching with hot (80°C) water on lithium retention.

RESULTS AND DISCUSSION

The purification of IPC-1478 paper, Series N, was continued with two additional lots of paper, Samples 428 and 430, as shown in Table I. The purified paper for each lot (before the addition of Kronisol) showed the small but positive advantage of two successive purification stages. Thus, the uranium and lithium levels for samples 427 and 429 were somewhat lower than those, 389 and 398, from the first stage, respectively. Based on these data and those reported previously (3), the present method has failed to reach the goal for lithium at < 0.4 ng Li/g of paper. Although data are incomplete at present, the limit for lithium in the purified Series N appears to be relatively steady at 1 ng Li/g.

In an effort to gain more knowledge about the possible role of fines in lithium retention, fines were collected from Series N paper. The general procedure, as reported previously (2), was followed except that the process water was not recycled. The experiment was designed to expose the fines to the lowest possible concentrations of lithium. As shown in Sample 436, Table I, the fines retained 10 times the concentration of lithium held by the residual fiber (436). This result is consistent with those reported previously (4).

Additional experiments are under way to test by means of isotopically labeled (lithium-6) samples the accessibility of lithium in residual fiber. Also, the efficacy of leaching paper with hot (80°C) water will be tested.

Samples 374C and 411, Table I, were reanalyzed and the new lithium values were found to be consistent with other data.

TABLE I

ANALYSIS OF SAMPLES FROM PROJECT 3101-1[a]

Sample No. 3101-	Amount Analyzed, g	Uranium 8/5	Uranium ng/g	Lithium, ng/g	Remarks
389	4.41	133	0.100	1.81	1st Cycle, 5 hours } 100-sheets of 19-inch
427	3.58	131	0.091	1.54	2nd Cycle, 5 hours } squares, Series N paper,
428	6.72	135	0.096	1.19	30% Kronisol added } Roll 11-2
398	3.70	134	0.126	2.33	1st Cycle, 5 hours } 100-sheets of 19-inch
429	4.39	122	0.083	1.59	2nd Cycle, 8 days } squares, Series N paper,
430	5.29	131	0.058	1.23	30% Kronisol added } Roll 11-3
435	5.21	130	0.584	5.47	Fines from 436, 0.218 g on pulp circle (341)
--	Concentration of Li in fines only			39	(see Report Seventeen, p. 9)
436	9.02	128	0.844	3.83	Fiber from Series N paper
437	200 ml	--	--	0.204 ng/ml	Filtrate from 435
374C	3.00	--	--	2.78	Sample reanalyzed (see Reports Sixteen, p. 3, and Seventeen, p. 4)
411	200 ml	--	--	0.009 ng/ml	Sample reanalyzed (see letter dated Feb. 19, 1975, Phelps to Dickey)

[a]These data were reported in a letter dated April 24, 1975, from Jack Phelps, McClellan AFB, to E. E. Dickey.

FUTURE WORK

The final two month's work on the present contract will be utilized chiefly in completing the purification of Series N paper in 19-inch squares. Several experiments are in progress to test the accessibility of lithium to hot (80°C) water and to exhaustive leaching by capillary movement of the reagents through a stack of paper. The final summary report for the year July 1, 1974 to June 30, 1975, will be started.

EXPERIMENTAL

389, 427, 428, 398, 429, 430. PURIFICATION OF SERIES N PAPER, 19-INCH SQUARES

Stacks of 19-inch squares, approximately 100 sheets from each of two rolls, were leached by percolation according to the general procedure described previously (1). Analytical data are listed in Table I.

435-437. RECOVERY OF FINES FROM SERIES N PAPER

Fines were collected from Series N paper according to the general procedure described previously (2) except that the filtered white water was not recycled. The analytical data are listed in Table I.

LITERATURE CITED

1. Project 3101-1, Report Seventeen, p. 13.

2. Reference (1), p. 16.

3. Reference (1), p. 4.

4. Reference (1), p. 8.

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