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About a year ago, Eichrom established a technical support group to develop application-specific methods and to provide help to our customers. We acquired some tech support scientists and we organized a rad-lab, working with a number of vendors to obtain counters and related equipment. For us, this was a major investment.

Setting up and operating the technical support group has given us a better understanding of what you experience in your operations and how we can be most useful to you. We recognize that our success depends upon our understanding of what radiochemists and lab managers need, and we count on our relationships with our customers to keep the information exchange vibrant. Everyone at Eichrom is proud of our hard-earned reputation as a technical resource, and we are striving to improve.

The demand for Eichrom's analytical products grew so rapidly that we have never had the luxury of exclusive expertise in the application of our products. In fact, we are often as much of a clearinghouse for other people's discoveries as we are a promoter of our own innovations. That trend continues in this edition of the newsletter with our presentation of

a method by Dr. N. Vajda and her colleagues for the single-step use of Eichrom's strontium resin in a sequential Pb/Po separation.

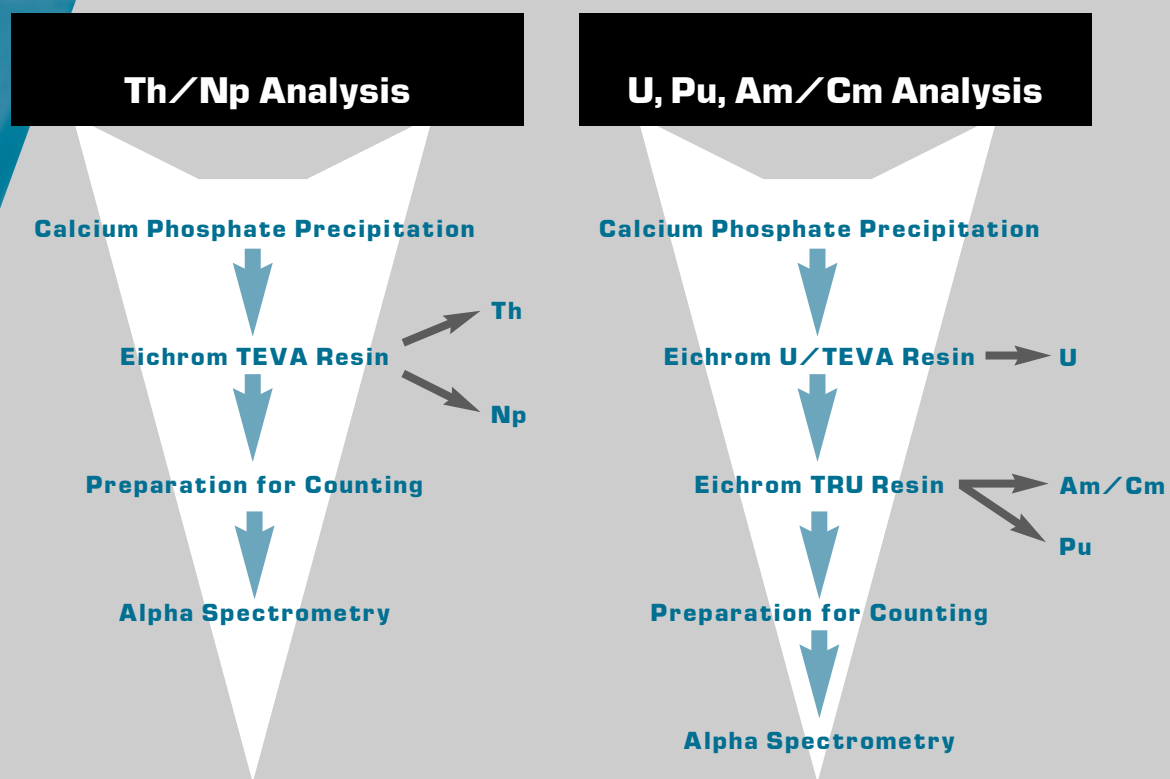
Also in this edition we preview several new products and new methods that have been developed in response to the requests of our customers. Eichrom's existence is testament to better science. We hope you will agree that our new products and ongoing methods development efforts reflect our commitment to that heritage.

Scott Wallace
 President

"We recognize that our success depends upon our understanding of what radiochemists and lab managers need, and we count on our relationships with our customers to keep the information exchange vibrant."

NEW SEQUENTIAL METHODS...

Through our technical support group, Eichrom has developed two sequential methods for the separation of actinides in water samples. The first is for the separation of uranium, plutonium, and americium in water, while the second is for the separation of thorium and neptunium in water. The two methods can be combined for our clients who might like to separate all five of these actinides from one sample. The two methods are summarized below.



Both methods produce yields greater than 80% on a routine basis with excellent decontamination factors. Decontamination factors for both methods are presented below:

Actinide	DF in Th fraction	DF in Np fraction	DF in U fraction	DF in Pu fraction	DF in Am fraction
U-232	>10,000	2,000	NA	>10,000	>10,000
Pu-242	8,000	3,000	>10,000	NA	>10,000
Am-243	>10,000	>10,000	>10,000	1,600	NA
Th-228	NA	3,300	4,500	1,700	>10,000
Np-237	>10,000	NA	1,600	3,000	>10,000

Eichrom would be pleased to provide you with copies of these methods. Please contact Eichrom at: 708-963-0320 or fax your request to us at: 708-963-0381.



SEQUENTIAL

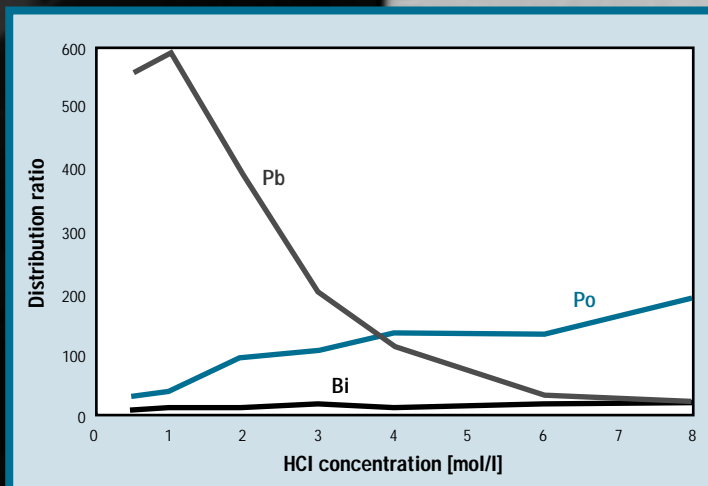
Pb, Po SEPARATION

USING EICHROM'S

Sr RESIN

Dr. Nora Vajda of the Technical University of Budapest (Hungary) recently optimized a method for Pb separations using Eichrom's Sr Resin. The usual difficulty encountered by those applying this resin to the analysis of Pb has been the removal of the Pb from the column after the separation has been effected. The retention of Pb is quite high in all concentrations of nitric acid. Among the various approaches to resolving this problem have been 1) counting the resin directly via LSC, 2) stripping the Pb with a complexing agent such as citric acid or ammonium oxalate, and 3) the use of the Eichrom Pb Resin.

Dr. Vajda characterized the Sr Resin under HCl conditions. As shown in the figure at right, Pb retention on the resin decreases sharply as HCl concentration increases. She found that 6M HCl could be used as a stripping agent for Pb.



Distribution ratios of Pb, Bi and Po in HCl solutions

The figure at left is an outline of a Po/Pb procedure Dr. Vajda developed which makes use of this HCl concentration-dependent behavior of lead.

Dr. Vajda presented this method and the pertinent validation data at Eichrom's recent French Users Meeting in Paris (2/95). A full paper has been submitted to and accepted for publication in The Journal of Environmental Radioactivity.

Copies of Dr. Vajda's slides from the Users Meeting are available from Eichrom upon request.

Po/Pb Analysis

Sample Dissolution

Load on Column in 2M HCl

Strip Po with 6M HNO₃

Strip Pb with 6M HCl

SUMMER '95 RELEASES:

- ▶ Nickel Resin
- ▶ Actinide Resin
- ▶ Tritium Column

FALL '95 RELEASE:

- ▶ Iodine Resin

This summer, we are pleased to introduce a number of new products. Beta site testing was begun for several of these products and as the results become available we will be able to optimize both the products and the methods for maximum efficiency. The Nickel, Actinide and Tritium columns are currently available.

The Iodine Resin should be released in the fall.

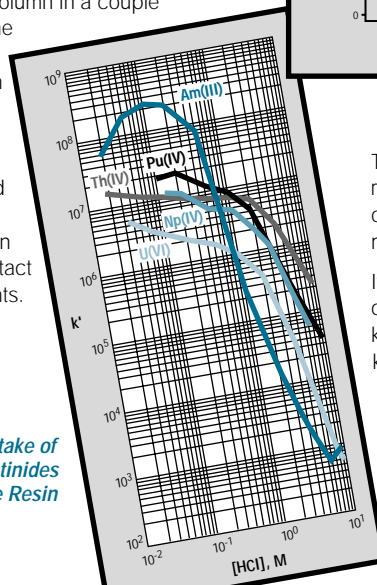
NICKEL RESIN

The nickel resin enables laboratories performing ^{59,63}Ni analysis to more easily complete the necessary chemical purification steps of the laboratory's method. Nickel resin eliminates the messy dimethylglyoxime precipitations common to most methods. Further, when combined with Eichrom's TRU resin, laboratories can perform a sequential separation from a single sample aliquot for ⁵⁵Fe followed by the nickel isotope separation, when required. This resin will save your laboratory analysis time and reduce waste generation.

ACTINIDE RESIN

The Actinide Resin exhibits extraordinarily strong affinity for actinides (III, IV and VI), while being relatively insensitive to macro concentrations of many commonly occurring matrix constituents. The ability to concentrate actinides from samples as diverse as soil, sediments, bioassay and sea water provides a technique which should greatly simplify sample preparation and subsequent separation. In experiments looking at the recovery of Am from acidified river water samples, 1 gram of resin has removed 100% of the Am from 3 litres of sample and over 90% of the Am from 8 litres of sample. The actinides can be stripped from the column in a couple of mLs. The materials have been evaluated in both a column format and as loose materials in batch contact experiments.

Uptake of various actinides by Actinide Resin

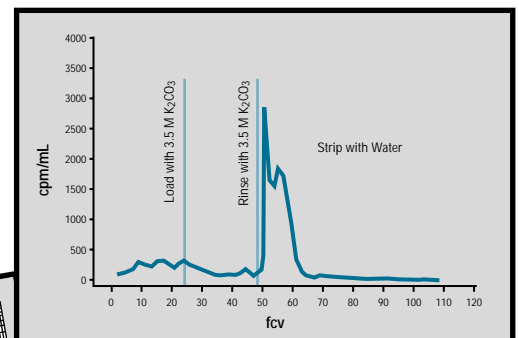


TRITIUM COLUMN

The tritium column provides laboratories with a method of preparing most samples for tritium analysis without involving distillation. A small aliquot (~25mL) of sample is passed over the column and effluent is collected. A portion of the effluent solution is then mixed with scintillation cocktail and counted. While we expect this product to be applicable to environmental water samples, we are testing the column with other matrices such as sea water, urine, high activity aqueous samples, etc.

IODINE RESIN

The iodine resin will provide laboratories with a method for the separation of iodine isotopes such as ¹²⁹I. This allows the laboratory to eliminate the use of organic solvents and other cumbersome separation techniques for this chemistry. The load and stripability of the resin is shown below:



Elution Curve for ¹²⁹IO₃ (fcv = 0.198 mL, 25°C)

These products have been developed in response to needs expressed to us. Please contact Eichrom if you would like more information on these new products.

If there are other products or materials you could use in your laboratory, please let us know. We encourage each of our customers to keep us informed as to their laboratory needs. Our goal is to provide you with products that make your separations more timely and cost effective. Give your product manager or Jim Harvey a call at: 708-963-0320.

CALENDAR OF EVENTS

On Monday, October 7, 1991, in Ottawa, Ontario, Canada, Eichrom held its first Users Workshop in conjunction with the 37th Annual Conference on Bioassay, Analytical, and Environmental Radiochemistry. Since that time, Eichrom has participated each year by sponsoring a workshop at the Bioassay Conference. The success of the workshops has led Eichrom to sponsor regional users seminars in which new Eichrom development work is presented and discussed, customer presentations are made and opportunities exist for users to discuss procedures, techniques, problems, and advantages related to the Eichrom products. Eichrom not only sponsors workshops, but has participated in a variety of other conferences nationally such as the Gatlinburg Conference, the Health Physics Conference, the GSA Annual Meeting and Exposition, the Waste Management Conference, and the International Low Level Waste Conference (EPRI). Eichrom has also participated in conferences abroad such as Ion-EX and the French Radiotoxicological Intercomparison Exercises. The first Eichrom workshop to be held internationally was in Manchester, England.

Below is a summary of recent workshops and conferences Eichrom has participated in as well as an upcoming conference and workshop schedule.

RECENT WORKSHOPS AND CONFERENCES:

35th ORNL/DOE Conference on Analytical Chemistry in Energy Technology,
October 11-13 1994, Gatlinburg, TN, U.S.A.

The 40th Annual Conference on Bioassay, Analytical and Environmental Radiochemistry, November 14, 1994, Cincinnati, OH, U.S.A.

Eichrom Users Group Meeting,
February 6, 1995, Manchester, U.K.

Eichrom Users Group Meeting,
February 9, 1995, Marne la Vallee, France

WM '95,
February 27 - March 2, 1995, Tucson, AZ, U.S.A.

Eichrom Western Users Workshop,
April 3, 1995, Denver, CO, U.S.A.

Eichrom "Hands-on" Chemical Separations Training,
April 24-28, 1995, Ministry of Agriculture, Food and Fisheries, Surrey, U.K.

Eichrom Southeast Users Workshop,
May 23, 1995, Atlanta, GA, U.S.A.

Eichrom Central/Northeast Users Workshop,
June 1, 1995, Cincinnati, OH, U.S.A.

Radiotoxicological Intercomparison Exercise,
June 14, 1995, Chinon, France

International Low Level Waste Conference & Exhibit Show '95 (EPRI),
July 10-12, 1995, Orlando, FL, U.S.A.

Eichrom does provide presentation material from its users group meetings and workshops. Please contact Eichrom if you are interested in receiving any of this material.

UPCOMING WORKSHOPS AND CONFERENCES:

Eichrom West Coast Users Workshop,
Tentatively scheduled for August, 1995, San Francisco Bay Area, CA U.S.A.

Eichrom Users Group Meeting,
September 1995, Tokyo, Japan

Ion - EX,
September 10-14, 1995, Wrexham, U.K.

36th ORNL/DOE Conference on Analytical Chemistry in Energy Technology,
October 10-12, 1995, Gatlinburg, TN, U.S.A.

The 41st Annual Conference on Bioassay, Analytical and Environmental Radiochemistry, November 13-17, 1995, Boston MA, U.S.A.

RECOMMENDED READING

Add these items to your list of Eichrom recommended reading...

- Alvarez, Alicia, et al. "A New Method for Sr-90 Determination in Liquid Samples." *Journal of Radioanalytical and Nuclear Chemistry*. 91 (1995)
- Berne, Anna. "TRU and TEVA Used to Separate Th and Nd from Am After Microprecipitation." *40th Annual Conference on Bioassay, Analytical and Environmental Radiochemistry (Eichrom Workshop)*. Cincinnati, OH. November, 1994.
- Chabaux, F., et al. "A New Ra-Ba Chromatographic Separation and its Application to Ra Mass-Spectrometric Measurement in Volcanic Rocks." *Chemical Geology*. 114 (1994), 191-197.
- Chiarizia, R. and Horwitz, E. P. "Uptake of Metal Ions by a New Chelating Ion Exchange Resin: Calculations on The Effect of Complexing Anions. (Part 6)" *Solvent Extraction and Ion Exchange*. 12 (1994), In Press.
- Hagan, M. "The Determination of Technetium-99 in Environmental Samples Using a Novel Separation Technique." *Seventh International Symposium on Environmental Analysis*. Bournemouth, U.K. September, 1994.
- Ham, G. J. "Determination of Actinides in Environmental Materials Using Extraction Chromatography." *Seventh International Symposium on Radiochemical Analysis*. Bournemouth, U.K. September, 1994.
- Horwitz, E. P., et al. "Separation and Preconcentration of Actinides by Extraction Chromatography Using a Supported Liquid Anion Exchanger: Application to the Characterization of High-Level Nuclear Waste Solutions." *Analytical Chimica Acta*. (1995) In Press.
- Horwitz, E. P., et al. "Uptake of Metal Ions by a New Chelating Ion Exchange Resin: The Effect of Matrices. (Part 5)" *Solvent Extraction and Ion Exchange*. 12(4), 831-845 (1994).
- Horwitz, E. P., et al. "A Lead-selective Extraction Chromatographic Resin and Its Application to the Isolation of Lead from Geologic Samples." *Analytical Chimica Acta*. 292 (1994) 263-273.
- Jump, Robert, et al. "Simultaneous ICP in Conjunction with Sr Resin as a Tool for Improving Sr-89/90 Determination in Environmental Samples." *40th Annual Conference on Bioassay, Analytical and Environmental Radiochemistry*. Cincinnati, OH. November, 1994.
- McCurdy, David E., et al. "Comparison of Existing Radiostrontium Procedures Utilizing the Eichrom Sr+Spec Column." (Updated at) *40th Annual Conference on Bioassay, Analytical and Environmental Radiochemistry*. Cincinnati, OH. November, 1994.
- McCurdy, David, et al. "Radiostrontium Procedure Using Cerenkov Counting Developed at the Yankee Atomic Environmental Laboratory." *40th Annual Conference on Bioassay, Analytical and Environmental Radiochemistry (Eichrom Workshop)*. Cincinnati, OH. November, 1994.
- Peiffer, David and Jassin, Lawrence. "Northeast Utilities, Millstone Station Experience with Eichrom Industries' Diphonix™ Selective Ion Exchange Resin in Liquid Radwaste Processing." *WM '95 Conference*. Tucson, AZ. March, 1995.
- Pin, Christian, et al. "Concomitant Separation of Strontium and Samarium-Neodymium for Isotopic Analysis in Silicate Samples, Based on Specific Extraction Chromatography." *Analytica Chimica Acta*. 298 (1994), 209-217.
- Tipton, Rebecca J., et al. "Sequential Separation and Quantitative Analysis of TRU and Uranium in Urine." *40th Annual Conference on Bioassay, Analytical and Environmental Radiochemistry (Eichrom Workshop)*. Cincinnati, OH. November, 1994.
- Totura, George. "Uranium Removal from Nuclear Fuel Processor Wastewater by Specialty Ion Exchange." *Radioactivity & Radiochemistry*. 5 (1994), 18-21.
- Vajda, N., et al. "A Novel Technique for the Simultaneous Determination of ²¹⁰Pb and ²¹⁰Po Using a Crown Ether." *Journal of Environmental Radioactivity*. (1995) In Press.

If you are aware of any other articles or presentations in which Eichrom's products were used, please let us know. Contact your Eichrom representative.

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Eichrom is pleased to announce...

the appointment of Packard Instrument Company as its exclusive distributor in 10 countries, primarily in Western Europe. Packard subsidiaries in Australia, Austria, Belgium, Denmark, France, Germany, Italy, Luxembourg, the Netherlands and Switzerland will provide all sales and technical support to Eichrom's customers in these countries. The addition of local supply of our products, technical support in the local language and purchasing in local currency will increase the level and quality of service our customers receive. It will also streamline the purchasing process for most of the affected customers.

Packard is a subsidiary of Canberra Industries, Inc., the market-leading manufacturer of alpha spectroscopy, gamma spectroscopy and liquid scintillation equipment. We welcome Packard and their subsidiaries into the Eichrom community worldwide. Eichrom's other agents are Hichrom Chromatography in the United Kingdom, Ingeniør F. Heidenreich AS in Norway and Sowa Trading Company in Japan.

For additional information, contact:

EICHROM INDUSTRIES, INC.

8205 S. Cass Avenue, Suite 107

Darien, Illinois 60561 U.S.A.

Toll-Free: 1-800-422-6693

Phone: (708) 963-0320

Fax: (708) 963-0381