RadChem Info

Stainless Steel planchets

DGA Resin

Agenda

N°3 - December 2005

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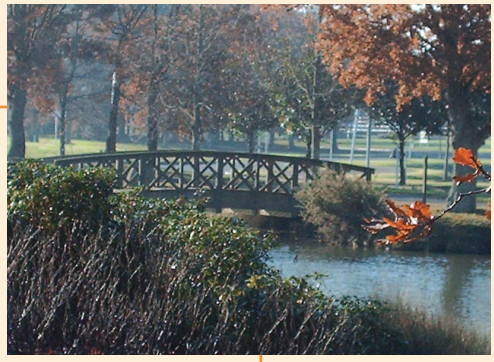
Expertise. Commitment. Results.



Edito

As the end of 2005 approaches, we at Eichrom would like to take this opportunity to wish you a happy holiday season and a successful new year in 2006.

In this issue of RadChem Info, we will continue the discussion of DGA resin we began in the last issue. This time our focus will be on applications to Ra-Ac and Y-Sr separations. We are also happy to tell you about a new product we have introduced last September : stainless steel planchets.

We would like to thank the participants at Eichrom's three European Users' Group Meetings this autumn. It has been a great pleasure to meet many new people and to renew the acquaintance of a number of old friends.

The 2006 price list is now available upon request; so do not hesitate to contact us to obtain a copy.

I look forward to seeing many of you in 2006.

Aude Bombard
Product Manager
Eichrom Europe

Eichrom Europe
Campus de Ker Lann • Parc de Lormandière, Bât. C,
Rue Maryse Bastié • 35170 Bruz – France
Tel. : +33 (0)2 23 50 13 80 • Fax : +33 (0)2 23 50 13 90
e-mail : eichromeurope@eichrom.com

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DGA Resin : Other Applications

Previously, we presented Am affinity for DGA Resin and possibilities for separating it selectively and not "by default" as it is the case with UTEVA and TEVA (cf. RadChem Info, September 2005).

DGA resin can also be used for the separation of radium-actinium and yttrium-strontium. The data presented below were obtained with DGA, Normal resin (50-100 µm).

Ra/Ac separation

For the determination of Ra-226 and Ra-228, Ba-133 is used as a tracer to evaluate Ra chemical yield. Ba-133 quantification is done by gamma spectrometry. Ra-226 is quantified by alpha spectrometry after micro-precipitation with $BaSO_4$. Ra-228 is determined via its daughter Ac-228 either by gamma spectrometry or by gas flow proportional counting after micro-precipitation with CeF_3.

Figure 1 shows k' values of Ra and Ce with respect to acid concentration. Ce is a chemical analogue of Ac and it can reasonably be assumed that Ac behaviour on this resin will be similar to Ce behaviour. In HNO_3 media, Ra shows no real affinity for the resin ($1 < k'(Ra) < 7$).

However, Ce has $k' > 1000$ for concentrations higher than 1M. So Ac should be easily retained on the resin for concentrations in HNO_3 of 1–3M while Ra elutes. In HCl media, the separation is efficient at 8M (selectivity (Ce/Ra) > 1E+05). In both HNO_3 and HCl, Ce may be stripped at low acidic concentrations (e.g ., < 0.5 M HCl).

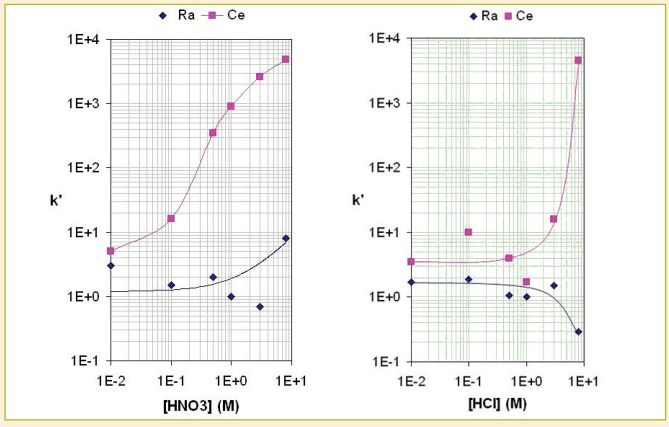


Figure 1 : Ra and Ce elution profiles with respect to acidic media and concentrations.

Y/Sr Separation

Experiments were also performed to determine the behaviour of Y, Sr and Ca on DGA Resin. The results obtained are presented Figure 2. Contrary to Sr resin, DGA resin shows very strong affinity for Y ($k' > 1E+05$ at 3M HNO_3) and lower affinitiy for Sr, Ca and Ba. This allows first the elution of Sr, Ca and Ba then the selective stripping of Y. Sr and Ca present similar elution profiles. Coupling Sr and DGA resins then allows to purify Y-90 to a great extent.

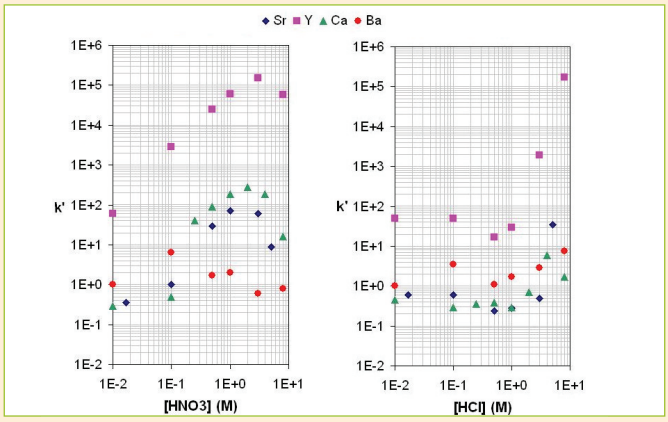


Figure 2 : Y, Sr, Ca and Ba elution profiles on DGA, Normal resin with respect to acidic media and concentrations.

Study of Interfering Elements

The study of the interfering elements like Bi, Pb, Fe and Cu gave the results shown Figure 3. DGA resin can be used for Bi separation. The resin shows no affinity for iron and copper both at low HCl concentrations, and over a wide range of HNO_3 concentrations. In addition, it is also important to note that k' value for Al(III) and Ti(IV) is less than 2 for all concentrations of either HNO_3 or HCl.

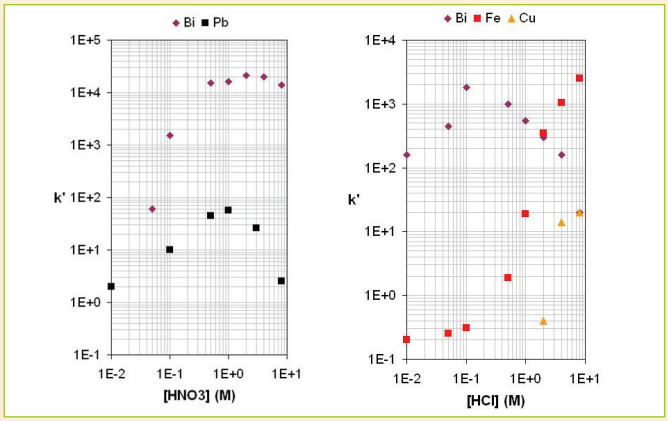


Figure 3 : Bi, Pb, Fe and Cu elution curves with respect to acidic media and concentrations.

Bibliographic References

(1) Horwitz E.P., McAlister D.R., Bond A.H., Barans R.E., *Solv. Extr. Ion Exch.*, **23**,219 (2005).

(2) Horwitz E.P., Bond A.H., Barans R.E., McAlister D.R., *27th Actinide separations Conferences*, (2003).

Do not hesitate to contact us for more details

In Brief

Eichrom Users' Group Meetings

We thank all of you who participated in our Users' Group meetings this year. We have enjoyed seeing you and meeting many new users at these events. We hope these meetings have been valuable to you. The presentations given during these meetings are now available on our website http://www.eichrom.com/radiochem/meetings/.

During these meetings, we asked participants how they would like us to organise future Users' Group Meetings. Based on the input we received, in the coming years we will start alternating traditional presentations on new products and developments with more practical workshop sessions in which we'll focus on specific topics related to real world applications. For example, application of Eichrom procedures to higher masses/volumes of sample or application of a water procedure to a soil matrix. We'll invite users to present their experiences and encourage much more discussion among all the participants.

So, we are now calling for subjects you would like to be addressed in next year's workshops.

Technical Infos

2006 Pricelist

2006 pricelist is available upon request by phone, post or e-mail.

Electrodeposition Planchets/Alpha Source Preparation

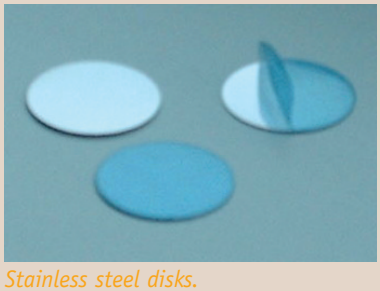
Since last September, our product line has grown with the addition of a new accessory : stainless steel planchets. The disks are made of 304 austenitic type stainless steel, the composition of which is given in Table 1. At present, we are able to supply disks with 25.4 mm (1") diameter, 0.4 mm (0.016") thickness. One face is covered with protective tape. Ordering information is found in Table 2.

Elements	Composition (%)
Carbon	0.08 max
Manganese	2.00 max
Phosphorus	0.045 max
Sulfur	0.030 max
Silicon	1.00 max
Chromium	18.00 - 20.00
Nickel	8.00 - 10.00
Iron	Balance

Table 1 : Planchets composition.

Product	Quantity	Price (euros)*
AC-D100-IN25	100	60
AC-D250-IN25	250	150
AC-D500-IN25	500	275

*Table 2 : Description of available products (*2005 price for Europe).*



Stainless steel disks.

Do not hesitate to contact us for more details

Agenda

2006 Conferences

These are the Conferences/Congress to which we attend to participate. Please note that in 2006, the 52th Radiobioassay and Radiochemical Measurement Conference will be held in Chicago in October, and sponsored by Eichrom. Should you be interested, do not hesitate to contact us for more information.

> **MARC VII** : 3 - 8 April 2006, Hawaii - USA

> **15th Radiochemical Conference** : 23 – 28 April 2006, Mariánské Lázne – Czech Republic

> **2nd European Congress of the International Radiation Protection Association (IRPA)** : 15 - 19 May 2006, Paris - France

> **34th International Symposium of Environmental Analytical Chemistry** : 4 - 8 June 2006, Hambourg - Germany

> **International Workshop on Frontiers and Interfaces of Ion Exchange** : 11 - 15 June 2006, Antalaya - Turkey

> **Procorad** : 20 - 23 June 2006, Constanza - Romania

> **International Congress on Analytical Sciences** : 25 - 30 June 2006, Moscow - Russia

> **Euroscience Open Forum 2006** :15 - 19 July, Munich - Germany

> **1st European Chemistry Congress** : 27 - 31 August 2006, Budapest - Hungary

> **Environmental Radiochemical Analysis, 10th International Symposium** : 13 - 15 September 2006, Oxford - United-Kingdom

> **2nd Topical Workshop in Low Radioactivity Techniques (LRT 2006)** : 30 September - 3 October 2006, Aussois - France

> **52th Radiobioassay and Radiochemical Measurements Conference** : 23 - 27 October 2006, Chicago - USA

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> To those who have not yet answered, please let us know by phone, fax or e-mail if you want to subscribe to our quarterly RadChem Info. *Note that this is the last call for registration. The next RadChem Info will only be sent to those who have registered.*

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