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Edito :

Dear Users,

After a long time without conferences, meetings,... we were very happy to finally meet you again in person last year! 2022 has been a very busy year with several Users Group Meetings and workshops, and the participation to numerous conferences which allowed us to get back in contact with you and discuss face to face.

2022 has also been a year marked by supply issues, increase of raw material and energy costs, and shortage of skilled staff. In this new year 2023 managing uncertainties will again be a challenge for all of us.

In an effort to provide some visibility we commit to maintaining the 2022 pricing for our own production during the first 6 month of the year 2023.

Despite the difficulties the year 2022 presented, R&D remains one of the pillars of TrisKem. Accordingly, we are pleased to announce the commercialization of three new resins (TK102, TK222 and TK225) and accessories (new autodeposition kits). In this TKI newsletter we will discuss the new TK102 Resin and the autodeposition kits.

In any case we hope to be in touch with you in 2023 by e-mail, phone, video call, in-person meetings at the upcoming conferences and Users Group Meetings (https://www.triskem-international.com/ma/events) or during visits in your laboratories.

With my best wishes,

Michaela Langer

President Triskem International

TK102 Resin

The TK102 Resin is based on the same crown-ether that is also used in the SR and PB Resin (fig 1).

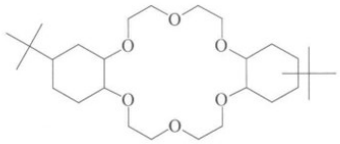

Figure 1: 4,4'(5')-di-t-butylcyclohexano-18-crown-6

Other than these resins the TK102 Resin contains a long-chained fluorinated alcohol as diluent. The resin further contains a larger amount of the crown-ether compared e.g. to the SR Resin. Further the organic phase is impregnated onto an inert support containing aromatic groups for increased stability against radiolysis.

The resin was originally optimized for the separation of Ba and Ra, how ever it also shows very interesting properties with respect to Sr and Pb separation.

Figures 2 and 3 show the selectivity of the TK102 Resin for a range of elements in HNO_3 (fig. 2) and HCl (fig. 3). Figure 4 shows the influence of increasing amounts of Na, K and Ca on the Sr retention in 3M HNO_3.

All D_W shown in these graphs were obtained through ICP-MS measurements.

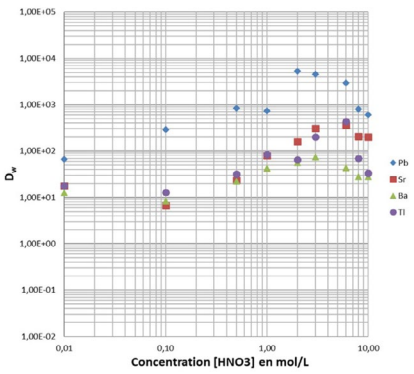

Figure 2: D_W values of selected elements on TK102 in HNO_3 [1]

Pb is very well retained over the whole HNO_3 concentration range. Sr is well retained at elevated HNO_3 concentrations (3 – 10M HNO_3), showing higher Sr DW values than the SR Resin under these conditions. The same is true for Ba at 3M HNO_3, TK102 shows stronger Ba retention than SR Resin. Further it is notable that Tl is strongly retained from 3 – 6M HNO_3.

As expected, Pb is well retained over a wide HCl concentration range, from dilute HCl up to 2 – 3M HCl. Pb D_W values drop strongly for higher HCl concentrations (≥ 6M HCl), allowing for its elution under these conditions. The TK102 Resin retains, to a certain extent similar to the TK400 Resin, a number of elements at very elevated HCl concentrations, including Tl, Sb, Sn, Ga and Nb.

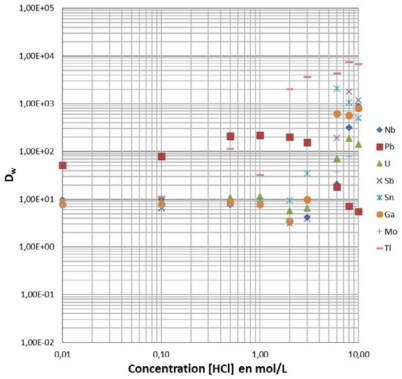

Figure 3: D_W values of selected elements on TK102 in HCl [1]

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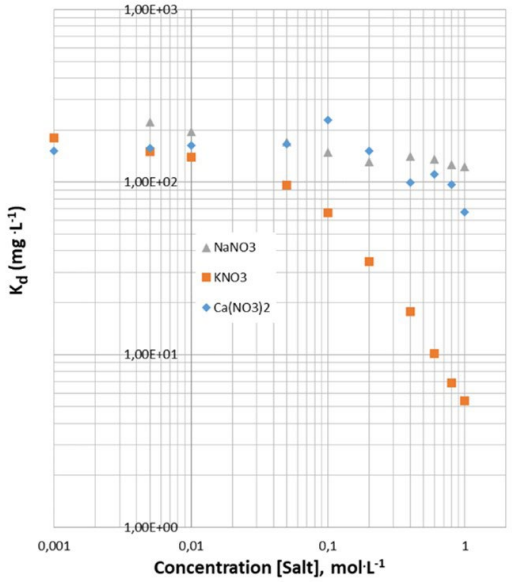


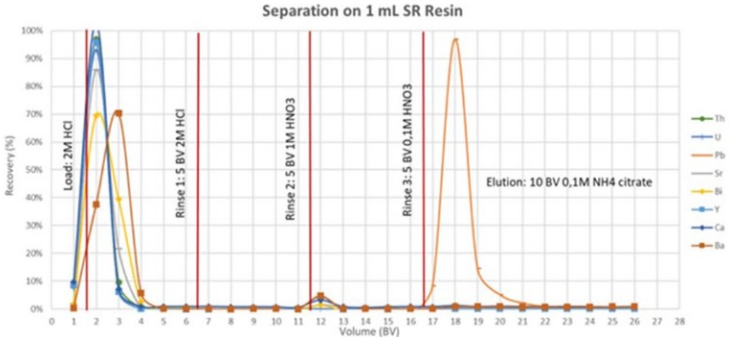
Figure 4: D_W values for Sr on TK102 in 3M HNO_3 and in presence of increasing amounts of Na, K and Ca[(1)]

Na shows very little influence on the Sr retention on the TK102 Resin, even at concentrations up to 1M D_W values for Sr remain high. Ca is showing a higher impact, nevertheless even at concentrations up to 0.5M Sr shows elevated D_W values.
As expected, K is interfering with the Sr retention very strongly, even concentrations ≥0.05M will lead to a significant decrease in Sr retention.

Just like for the SR Resin, performing a co-precipitation (e.g. with calcium phosphate) to remove K before the actual separation on TK102 Resin is crucial.

The following figures are showing three comparative elution studies on TK102 Resin and SR Resin.
The first example is a typical Pb separation based on loading from 2M HCl, Po removal with dilute HNO_3 and finally Pb elution with citrate.

Both resins are showing very similar elution profiles, TK102 Resin might require a slightly larger elution volume for Pb though. Nevertheless, typically employed elution volumes (e.g. 10 mL) should assure quantitative elution of Pb also from TK102.



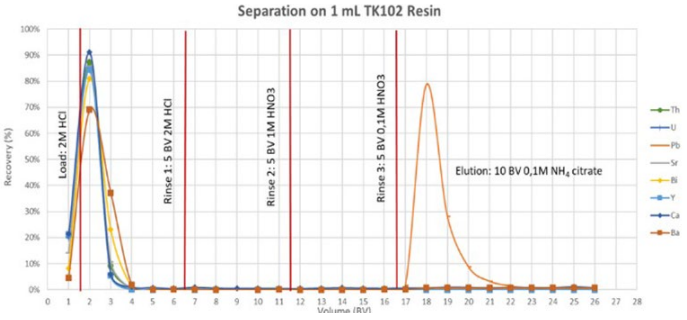


Figure 5: Comparative elution studies, SR and TK102 Resin, Pb separation[(1)]

The second example is a typical Sr separation based on loading from 3M HNO_3, rinsing with 8M HNO_3 and 3M HNO_3/0.1M oxalic acid, and finally Sr elution in 0.05M HNO_3.

Again, both resins are showing similar elution profiles. One distinct difference being Th, for the TK102 Resin 3M HNO_3/0.1M oxalic acid rinse is required to remove the Th while on SR Resin the majority is already removed with 8M HNO_3.

Like for the Pb separation Sr elution from TK102 seems to require slightly larger volumes, but here too typically employed elution volumes (10 – 15 mL) seem to assure quantitative Sr elution.

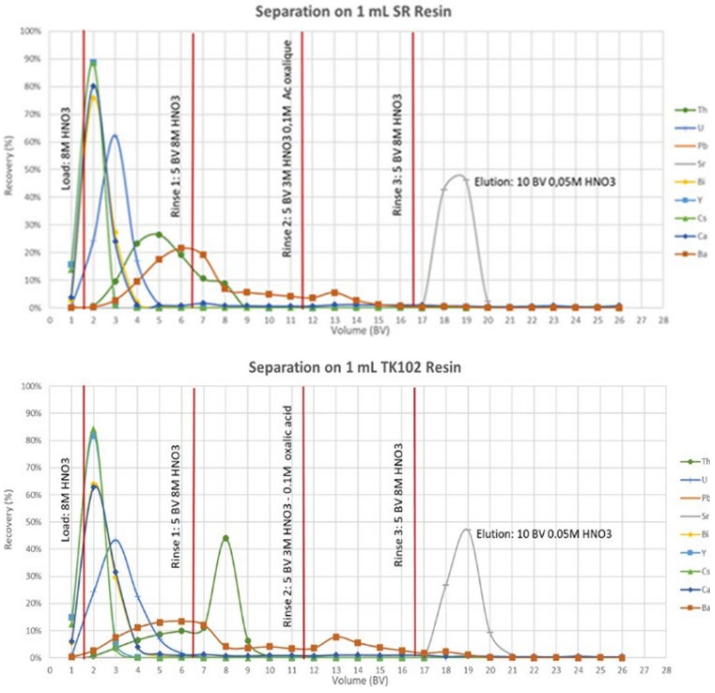


Figure 6: Comparative elution studies, SR and TK102 Resin, Sr separation [(1)]

The third example shows a comparative Ba/Ra separation elution study. TK102 and SR Resin were both loaded from 3M HNO_3, then both resins were rinsed with several bed volumes (BV) of 3M HNO_3.

For both resins Ra is eluted quickly during load and first rinsing steps, while Ba remains retained.

For more informations, please contact us at : contact@triskem.fr

On the SR Resin Ba starts to significantly break through after 6 BV, on the TK102 Resin the Ba retention is distinctively stronger, it starts to very slowly elute after about 8 - 9 BV.

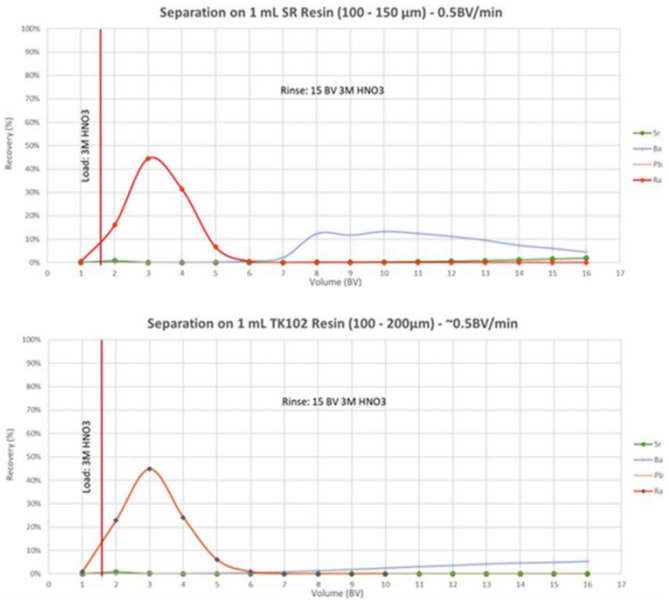


Figure 7: Comparative elution studies, SR and TK102 Resin, Ba/Ra separation[1]

Further the TK102 Resin shows high dynamic capacity for Sr (>40 $mg \cdot g^{-1}$) and Pb (>90 $mg \cdot g^{-1}$).

Due to the higher hydrophobicity of the diluent employed in the TK102 Resin it also shows significantly (>10 times) less bleeding of organic material, measured as Non-Purgeable Organic Carbon (NPOC), than the SR Resin.

Bibliography

(1) Illarion Dovhy, Marine Bas, Nora Vajda et al. : "Characterization of new crown-ether containing TK102 Resin for the separation of Sr, Pb and Ba/Ra", Poster presented at the 14th International Symposium on Nuclear and Environmental Radiochemical Analysis from 12 – 15/09/2022 in York (UK).
https://www.triskem-international.com/scripts/files/63317f16990d61.93025432/poster-tk102---v1.pdf

Hybrid UGM at CARM

Our next Users Group Meeting will take place on 22 February as part of the ***CARM conference*** organized by the National Physical Laboratory (NPL) from 20 – 22 February in Teddington (UK). You are cordially invited to participate!
The UGM will take place as a hybrid meeting (in-person at NPL and online via Teams).

In case you would like to participate in-person you can register via the conference website. During the registration process you can choose between two different tickets: 'Registration for Environment, Energy, Security' or 'Registration for the Whole Conference', both tickets will allow you to participate in our UGM, and in the other sessions during the indicated dates.
Please kindly use this occasion to have a look at the rest of the conference agenda! The in-person registration is open until 15 February.

In case you would like to participate to the UGM online you can register here. The online participation is free of charge.
Please contact Dr. Steffen Happel (shappel@triskem.fr) in case you would kindly agree to share your work with our users at this occasion, there are still slots available in our agenda. You will find regular updates on this UGM ***here***.

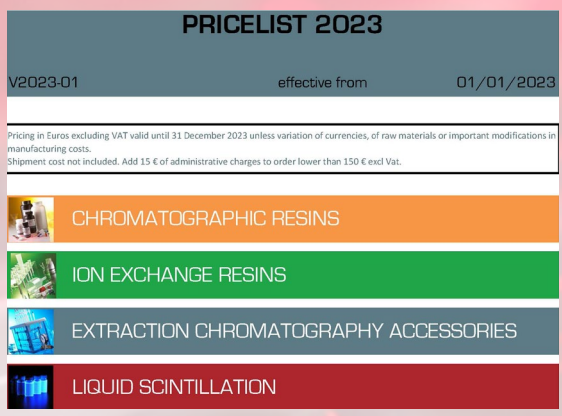
News

Pricelist

In an effort to provide some visibility we commit to maintaining the 2022 pricing for our own production during the first 6 month of the year 2023.
Our new price list is available upon request now.

New product

Further we are very glad to announce that the TK221 Resin is now also available in 50 – 100µm particle size (T grade).



Resolve ® Filters

As indicated in a previous communication, the supplier of the Resolve® Filters Eichrom Technologies had informed us that due to the discontinuation of the PP material originally employed in the fabrication of the filters the latter had to be changed to a new, PE based material.
More information on the testing and validation process can be found ***here***.
If you have any further questions, or if you would like to receive samples of Resolve Filters® prepared with the new PE materials please contact us.

Frits for 2 mL columns

On the same note, the supplier of the frits we are using in our 2 mL columns informed us without prior notice that they have discontinued this product, leading to a temporary unavailability of our reference AC-FRITS-500. Further reference AC-142-TK had to be sold without frits for the time being. We are very happy to announce that we have validated frits from an alternative supplier. During our tests columns prepared with frits obtained from our alternative supplier performed identical to columns prepared with frits from our previous supplier.
The only difference we have noticed during our tests is a slightly faster flow rate of the new frits. Accordingly, the situation will get back to normal for the above-mentioned references in the next weeks. The new frits will also be employed in our pre-filled columns soon. Please don't hesitate to contact us for more information and free samples of columns prepared with the new frits.

Autodeposition kits

We are very happy to announce that an updated version of our autodeposition kits are available now. Instead of cut plastic bottles these are now based on a ready to use plastic unit. Page 5 you will find a manual for the use of the new kits. Please contact us for more information and samples.

Agenda :

TrisKem will be participating to the following upcoming conferences and is very much looking forward to meeting and discussing with you there!

- Hybrid UGM at CARM, Teddington (UK) and online via Teams, 22/02/2023 ***https://www.triskem-international.com/users-group-meetings.php***
- 12th International Symposium on Targeted Alpha Therapy (TAT12), Cape Town (South Africa), 27.02 – 02.03.2023 ***https://tat-12.com/***
- International Symposium on Trends in Radiopharmaceuticals (ISTR-2023), Vienna (Austria), 17 – 21.04.2023 ***https://www.iaea.org/events/istr-2023***
- 3rd International Conference on Radioanalytical and Nuclear Chemistry (RANC), Budapest (Hungary), 07 – 12.05.2023 ***https://akcongress.com/jrnc-ranc/***
- 25th International Symposium on Radiopharmaceutical Chemistry (25th iSRS), Honolulu, Hawaii (USA), 22 – 26.05.2023 ***https://www.srsweb.org/isrs2023***
- Procorad, Fribourg (Switzerland), 21- 23.06.2023 ***http://www.procorad.org/en***
- SNMMI 2023 Annual Meeting (booth n° 1053), Chicago (USA), 24 – 27.06.2023 ***https://am.snmmi.org/iMIS/SNMMI-AM***
- Goldschmidt 2023, Lyon (France), 09 – 14/07/2023 ***https://conf.goldschmidt.info/goldschmidt/2023/meetingapp.cgi***
- 11th International Conference on Isotopes (11ICI), Saskatoon (Canada), 23. – 27.07.2023 ***https://www.11ici.org/***
- 36th Annual Congress of the European Association of Nuclear Medicine (EANM), Vienna (Austria), 09 – 13.09.2023 ***https://www.eanm.org/congresses-events/future-congress/***
- ENVIRA 2023, Sevilla (Spain), 17 – 22.09.2023 ***https://us.ticsmart.eu/envira-2023***

You'll find an update on our participations to conferences on our website : https://www.triskem-international.com/ma/events

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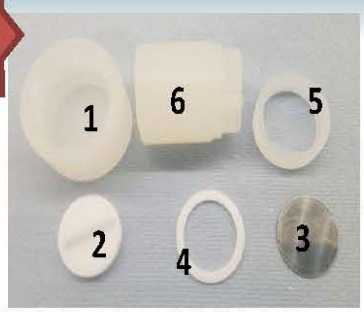
Auto-deposition KIT – AC-05-ADK

Instruction for Use

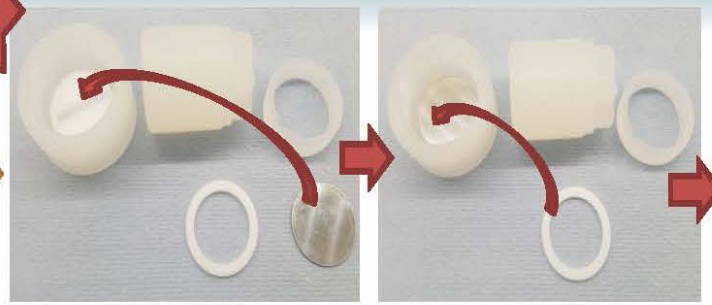
TRISKEM
Expertise in Separation Chemistry

A



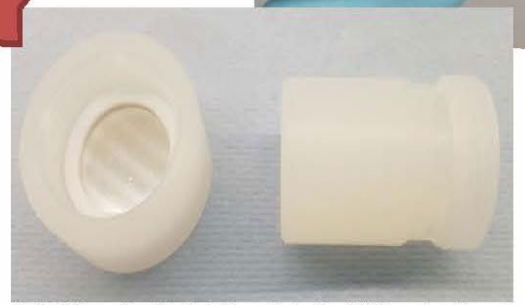
GB/EU (1) Plastic rotative unit, (2) Flat circular magnet Ring, (3) Disk, (4) Ring, (5) Clamping ring, (6) Retaining clip

B



GB/EU Insert (2) Flat circular magnet Ring into (1) Plastic rotative unit then the (3) Disk and the (4) Ring

C



GB/EU Place the (6) Retaining clip in the (5) Clamping ring

D

GB/EU Tighten the (5) Clamping ring in the (1) Plastic rotative unit

E

GB/EU The system is ready for deposition in a beaker on stirring plate