

## New Tools from the Tool Box

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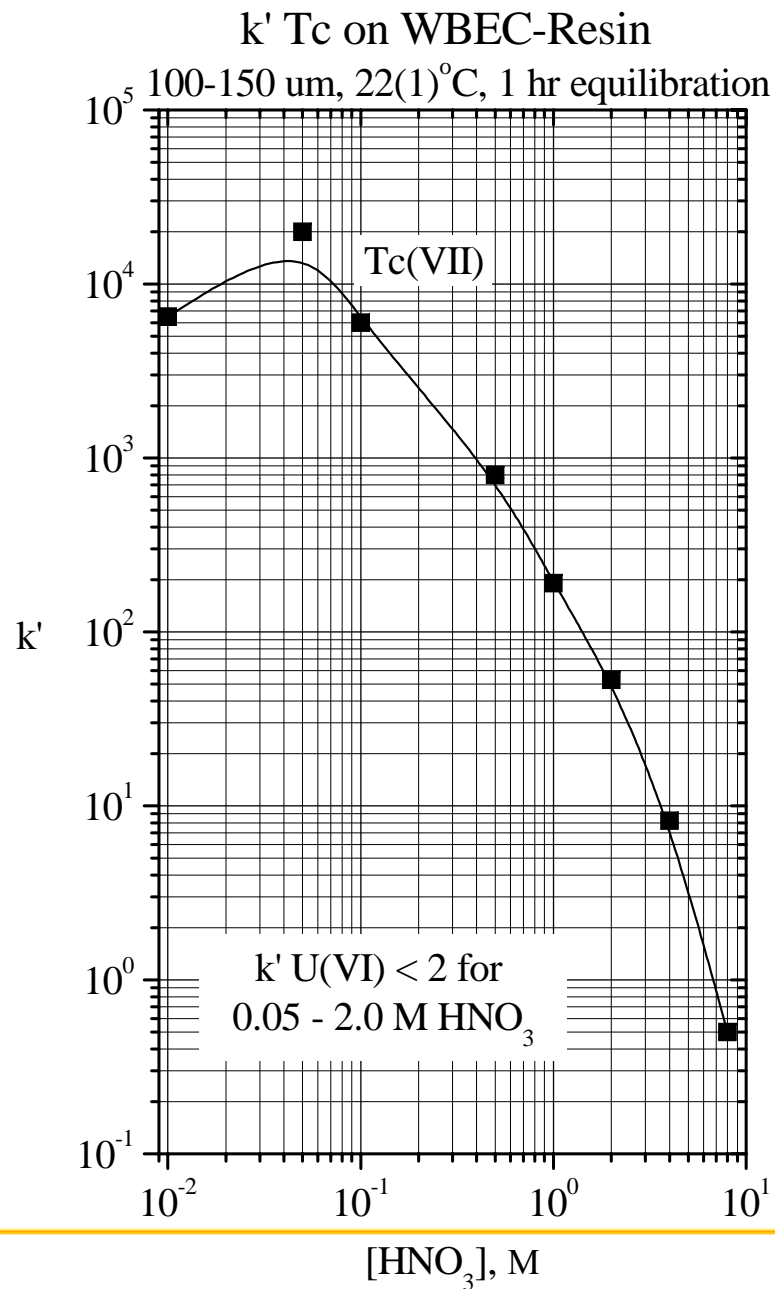
Eichrom User Group Meeting



## Outline

- 1) Tc(VII) Separations (New WBEC Resin allows for better Tc stripping behavior)
- 2) Method for isolating traces of U from solution containing high levels of Pu
- 3) Reducing Resin for better Pu decontamination factors

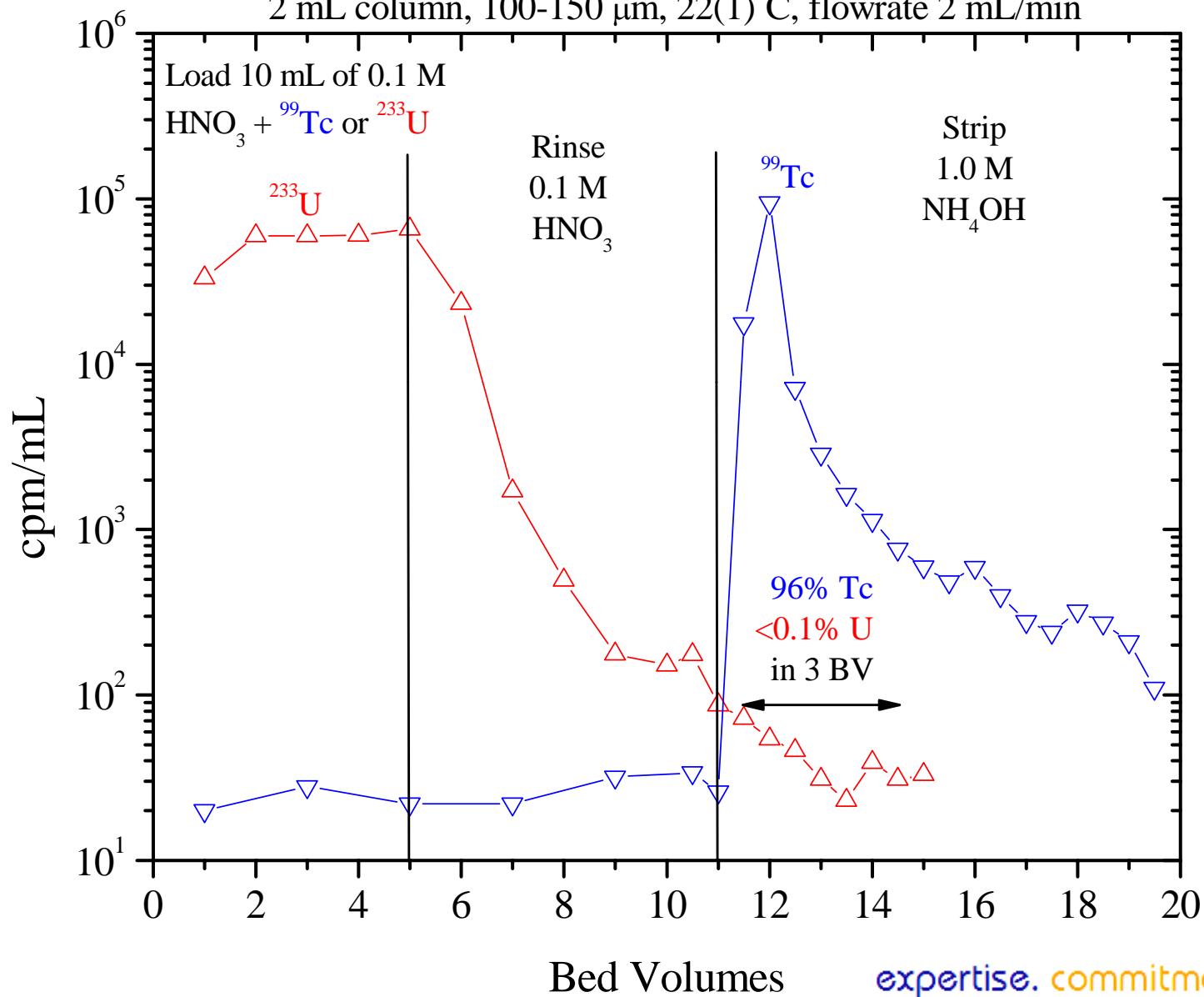
## 1) Tc(VII) Separations with WBEC Resin



$k' \text{ Tc(VII)} < 1$  for  
0.01 - 2.0 M  $\text{NH}_4\text{OH}$

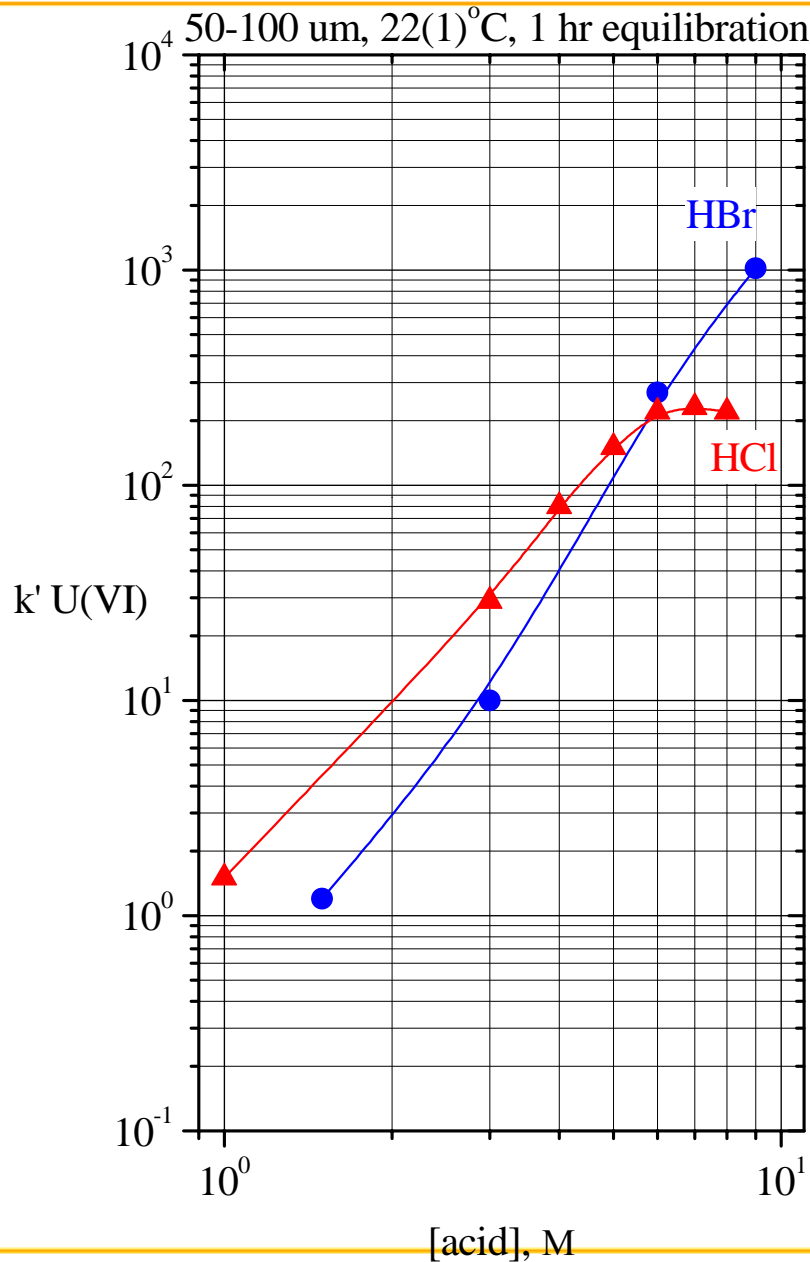
Elution of  $^{99}\text{Tc}$  and  $^{233}\text{U}$  on WBEC-Resin

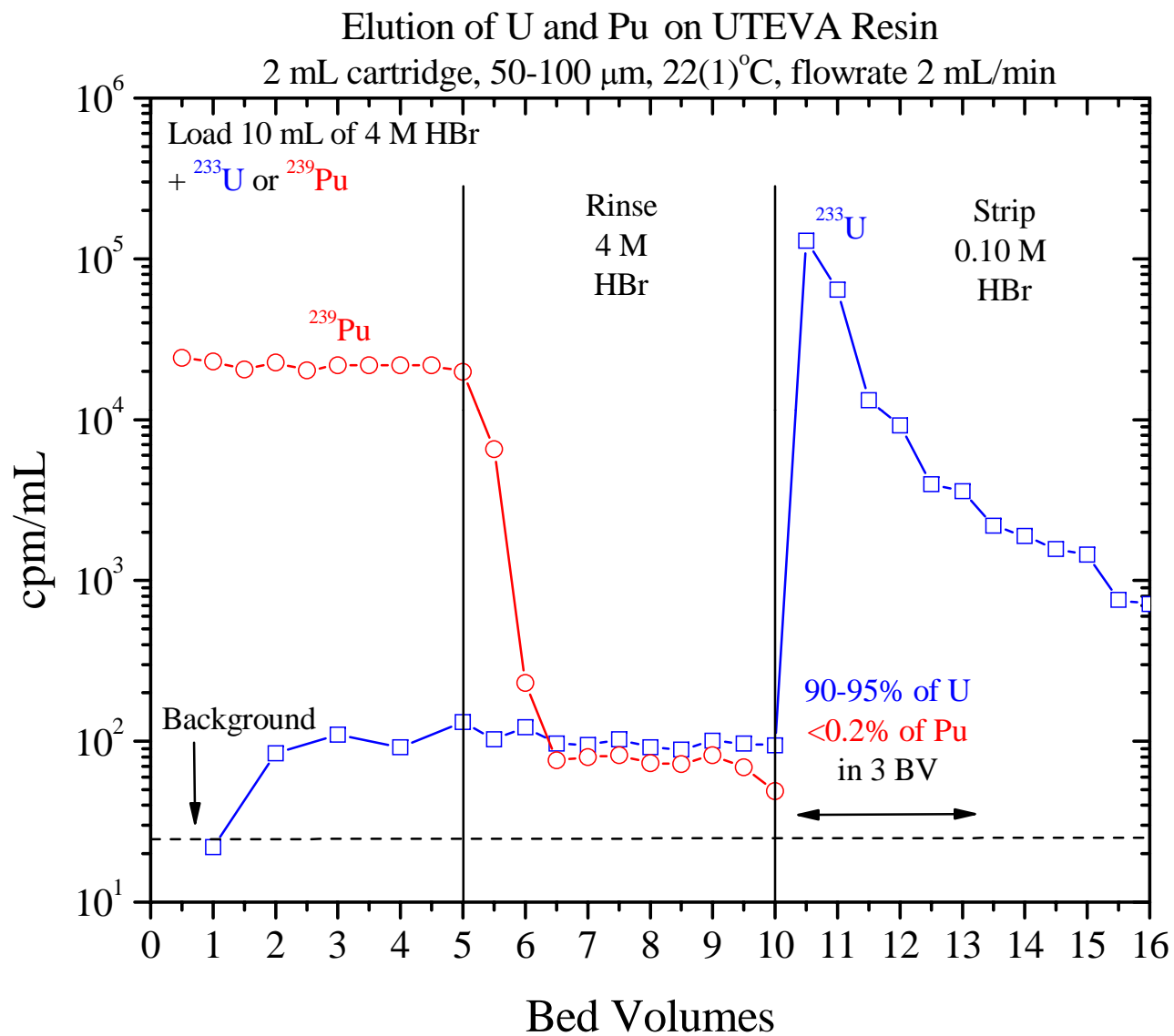
2 mL column, 100-150  $\mu\text{m}$ , 22(1) $^\circ\text{C}$ , flowrate 2 mL/min



2) Ultra-pure U from high levels of Pu

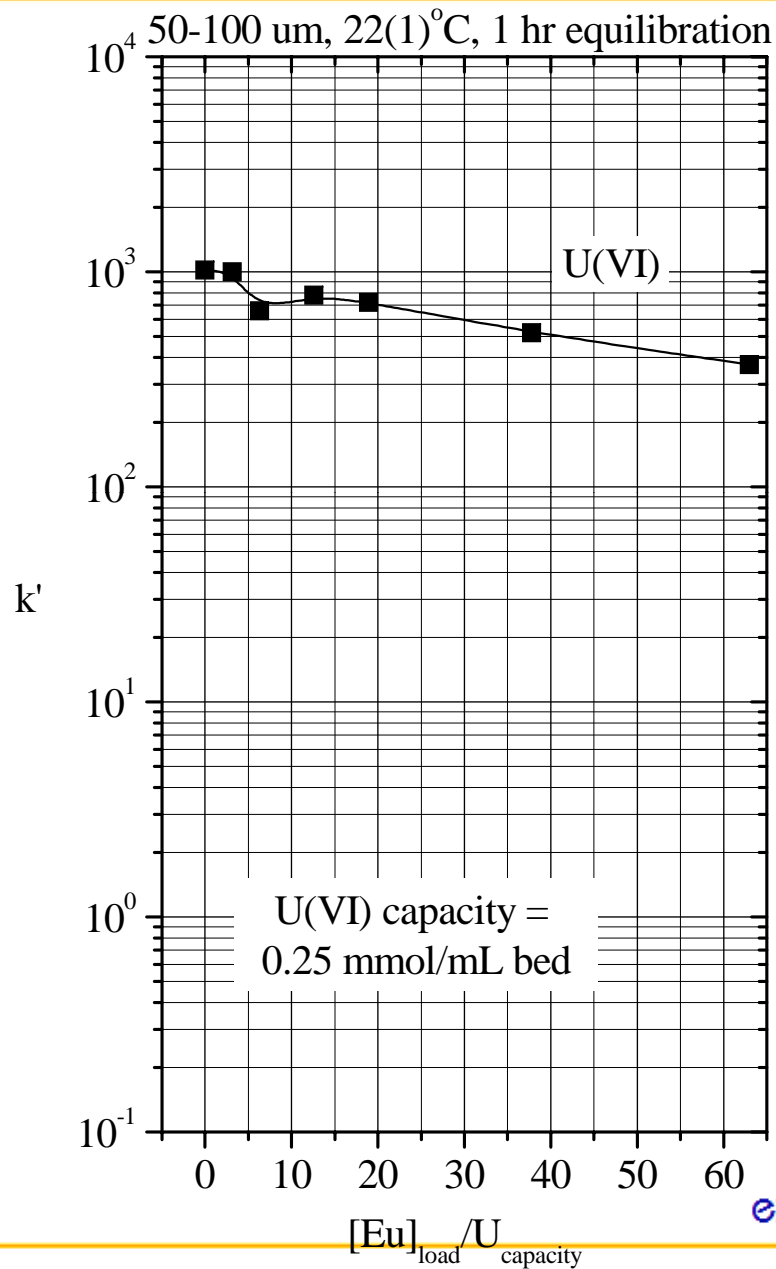
k' U(VI) on UTEVA from HBr and HCl



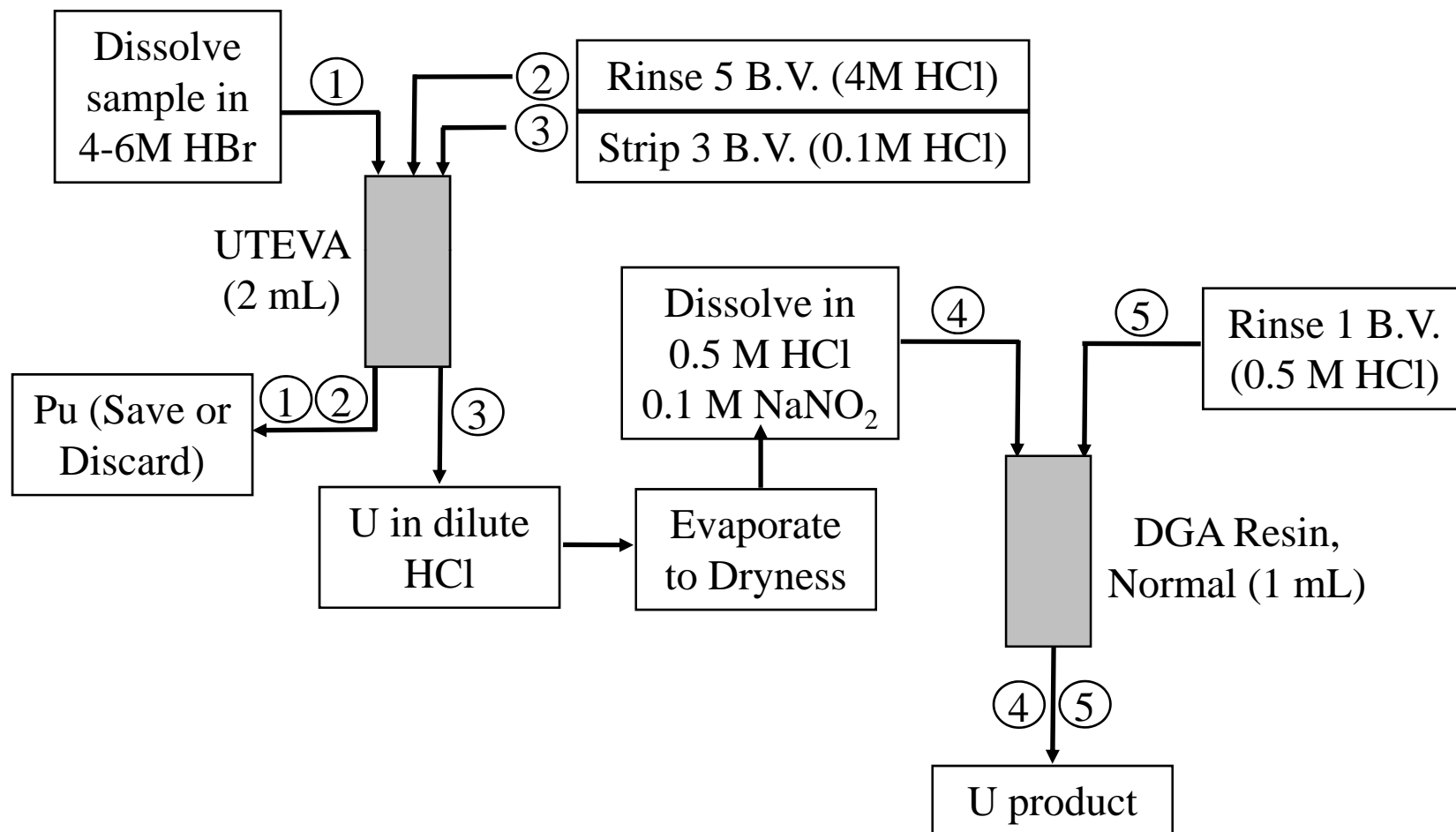


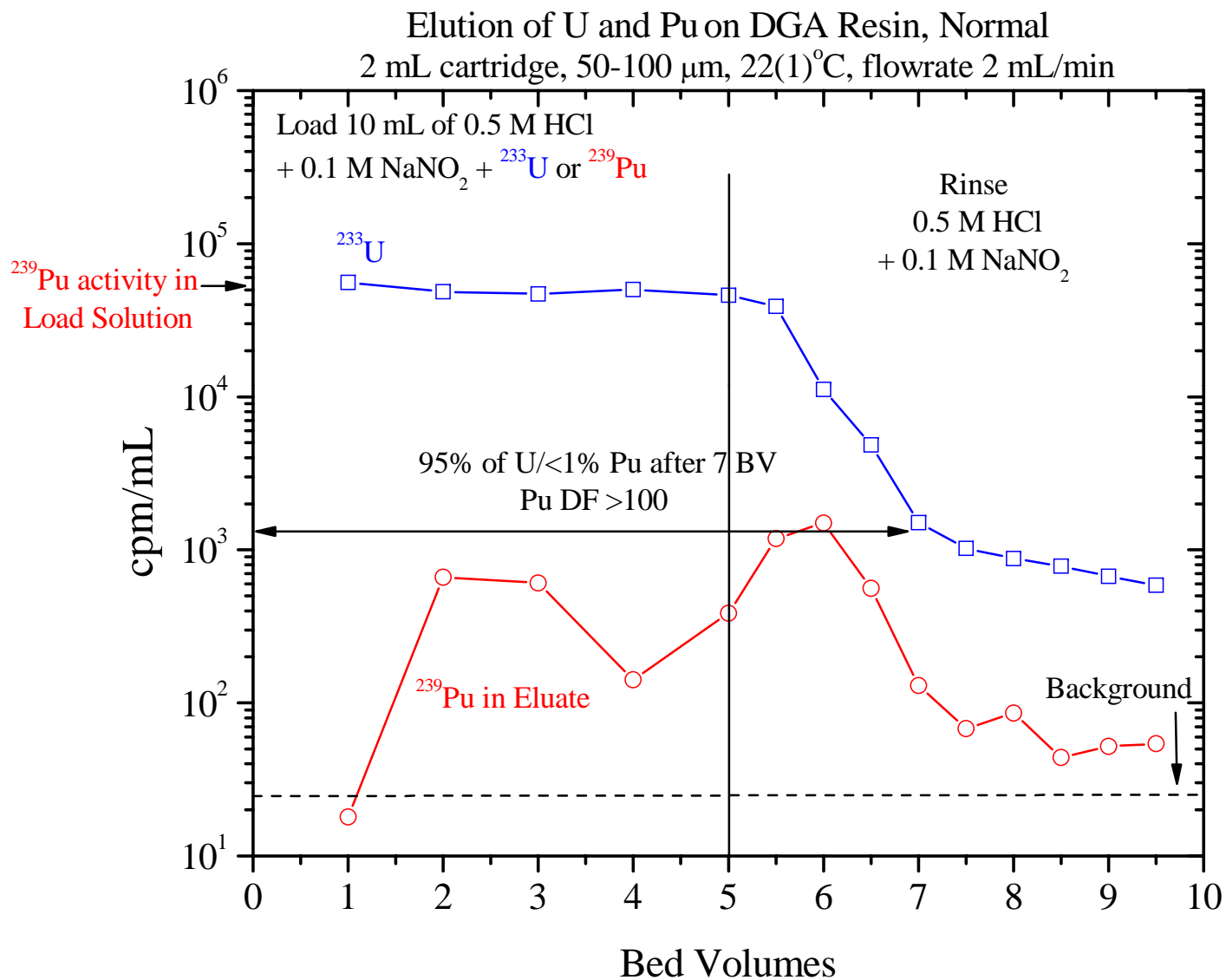


$k'$  U(VI) on UTEVA from 6 M HBr + Eu



## Separation of Trace U from Macro-quantities of Pu by Selectivity Inversion

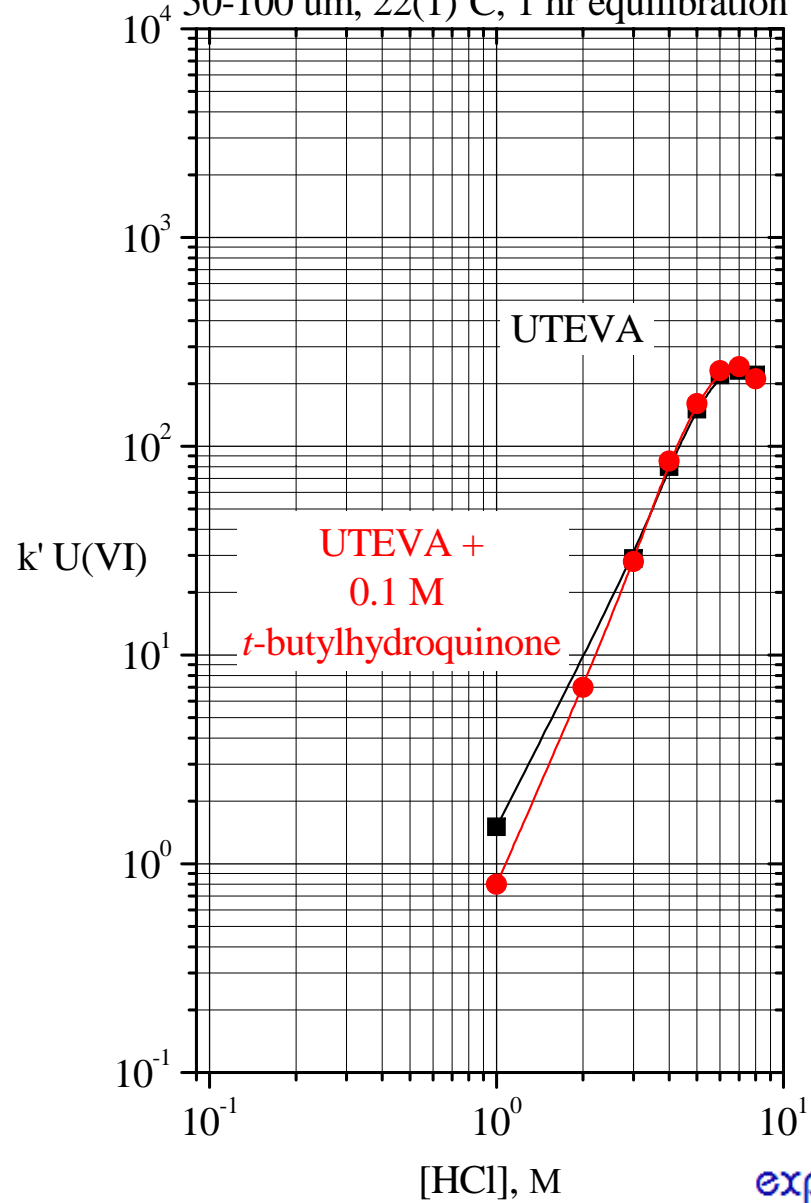




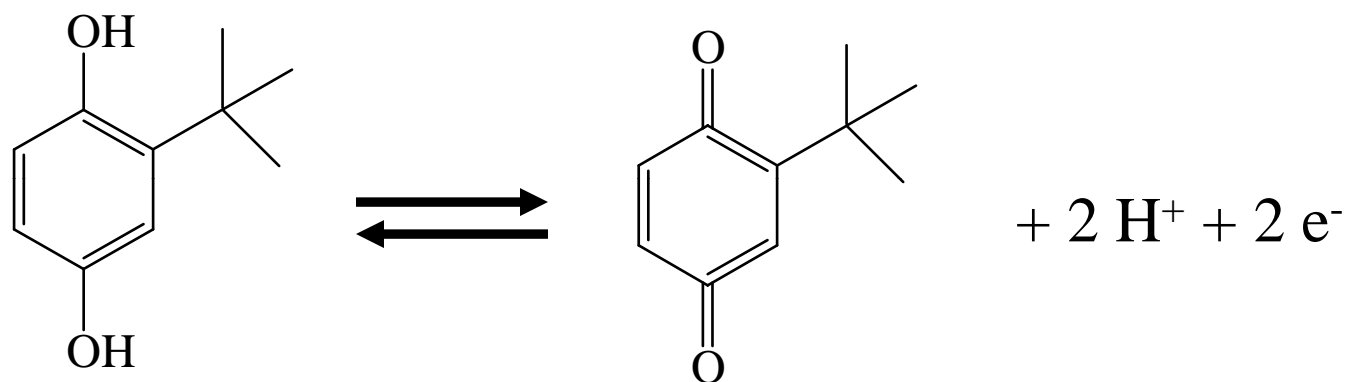
## 3) Reducing Resin

k' U(VI) on UTEVA from HCl

50-100  $\mu\text{m}$ , 22(1) $^{\circ}\text{C}$ , 1 hr equilibration

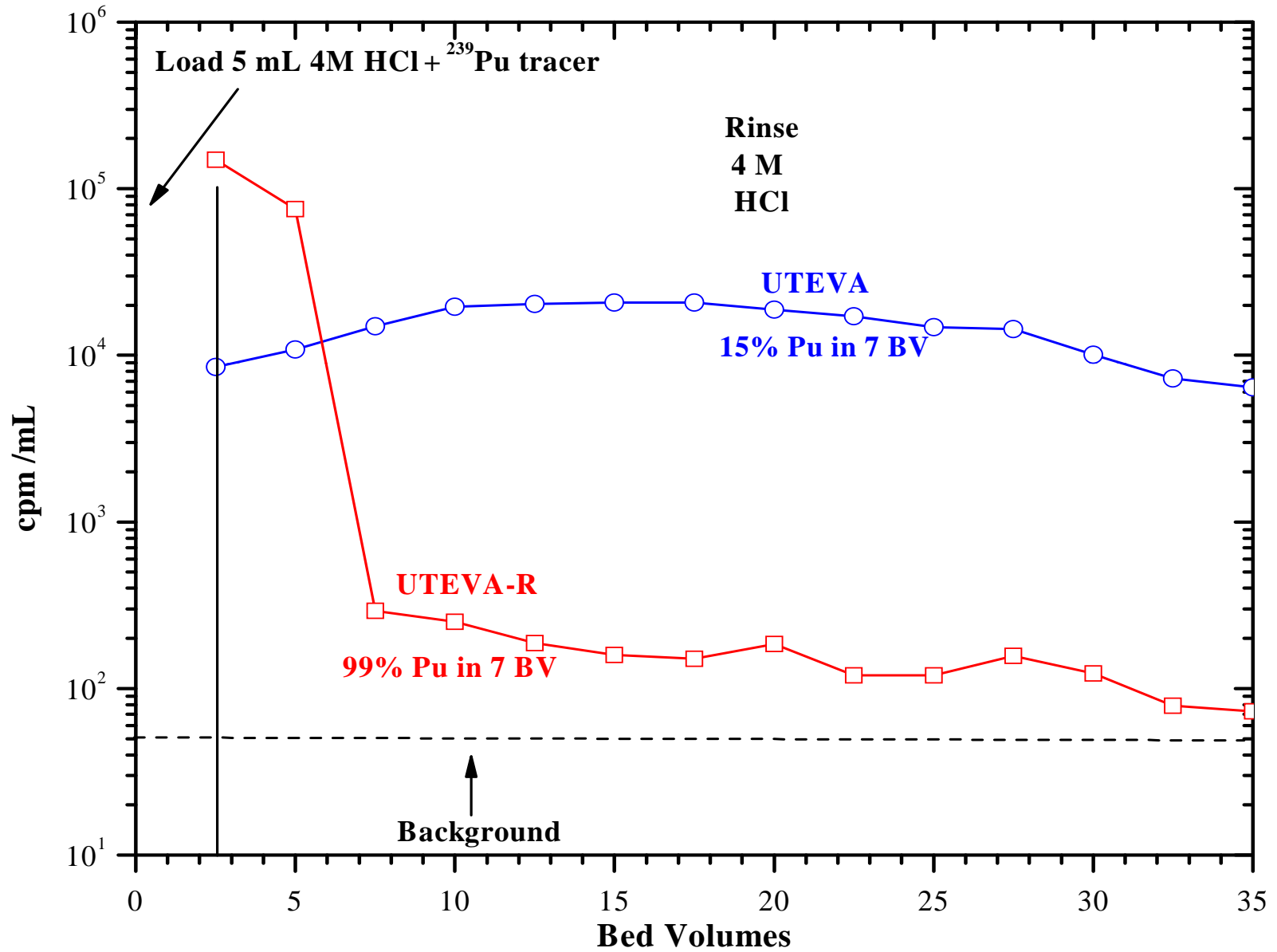


## Reduction with (*t*-butyl)hydroquinone

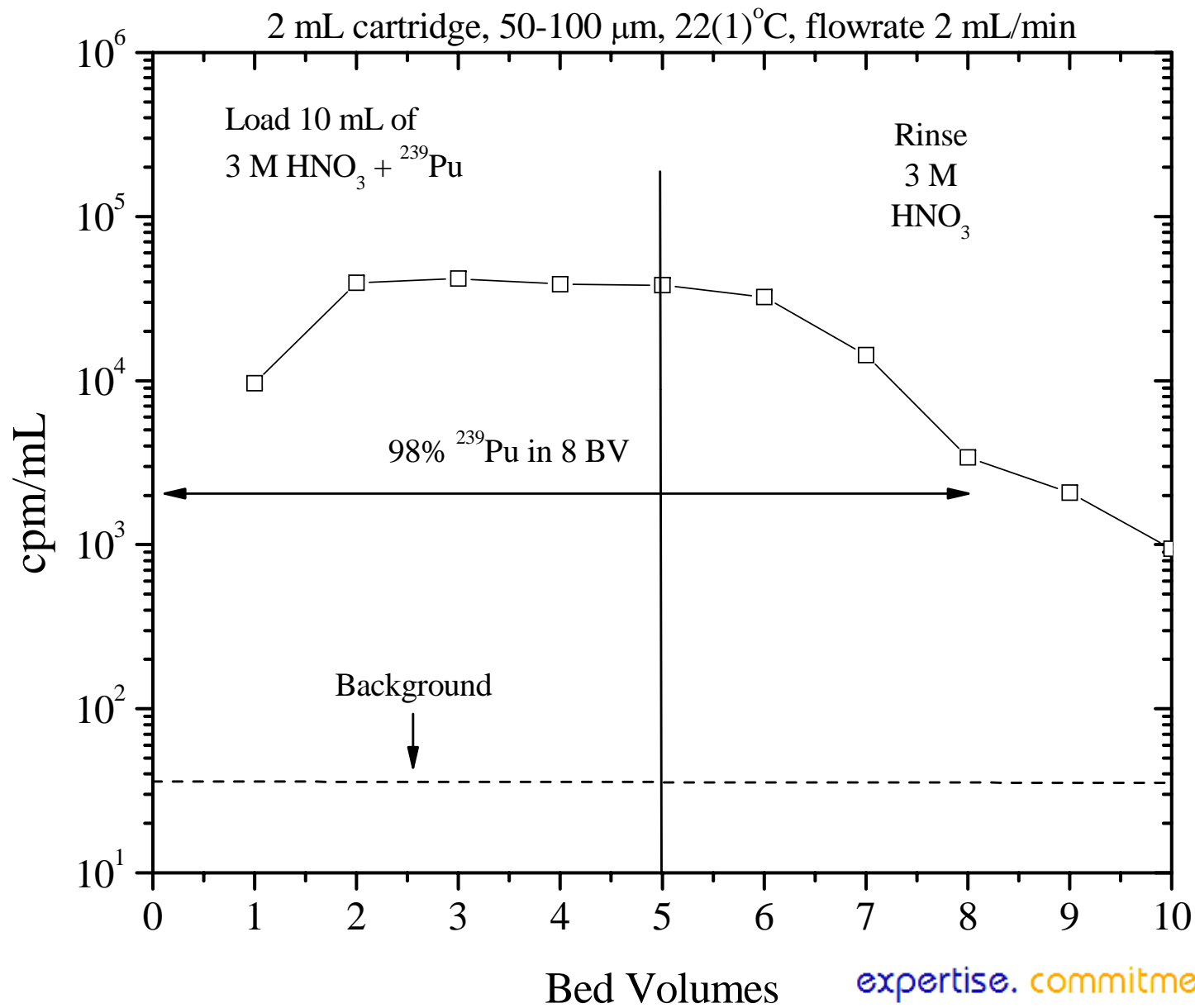


# cpm/mL vs. Bed Volumes of Eluate

50-100  $\mu\text{m}$  UTEVA or UTEVA-R Resin, Preconditioned with 4M HCl, 22(1)  $^{\circ}\text{C}$



Elution of  $^{239}\text{Pu}$  on UTEVA-R





# Summary

- These are examples of the flexibility of extraction chromatography
- WBEC and UTEVA-R Resins are currently in Eichrom's design and development system (ISO 9001:2000)