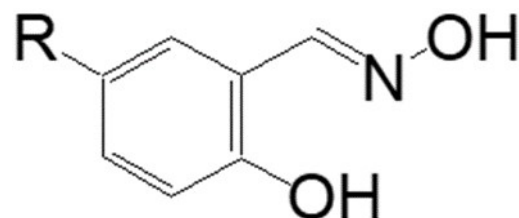


Copper Separation on CU Resin

Summary of Method CU Resin contains a benzaldoxime extractant adsorbed on an inert polymeric support. CU resin can be used to separate copper from other transition metals, such as zinc or nickel target material used in the production of Cu-64 and Cu-67. CU resin will selectively retain Cu from pH 2-5 HCl, HNO₃ or H₂SO₄, while Ni(II), Zn(II), Cd(II), Co(II), Fe(II), Fe(III), and Cr(III) are rejected. Cu can then be recovered from the Cu resin using 1-8 M HCl. Additional purification of Cu can be achieved by stripping the Cu resin with 8M HCl through a strong base anion exchange resin (AG1x8). The Cu will be retained on the AG1x8 and can then be recovered in dilute HCl.



Benzaldoxime extractant

The CU is very hydrophobic and can be difficult to wet in dilute acid. Soaking the CU resin in 2M HCl improves the wetting. However, the wetted resin will still float on top of the liquid, making it difficult to slurry pack the CU resin. It is therefore recommended that the CU resin be used in prepacked cartridges or dry packed columns. Wet the columns or cartridges with 5-10 bed volumes of 2M HCl and then precondition the CU resin with dilute acid prior to loading the Cu sample. To initiate flow on the dry packed column or cartridge, a vacuum box, peristaltic pump or luer syringe will be required.

Reagents

CU Resin

- 2 mL Cartridges (Eichrom CU-R10-S)
- 1 mL Cartridges (Eichrom CU1-R10-S)
- 25 g bulk resin, 100-150 μ m (Eichrom CU-B25-A)
- 25 g bulk resin, 50-100 μ m (Eichrom CU-B25-S)

Anion Exchange Resin (Eichrom A8-B500-F-CL)

Hydrochloric Acid (37%)

Ammonium Hydroxide (56%)

Deionized Water

Equipment

Vacuum Box (Eichrom AR-24-BOX or AR-12-BOX)

Cartridge Reservoir, 20 mL (Eichrom AR-200-RV20)

Inner Support Tubes-PE (Eichrom AR-1000-TUBE-PE)

Yellow Outer Tips (Eichrom AR-1000-OT)

50 mL Centrifuge Tubes

Vacuum Pump

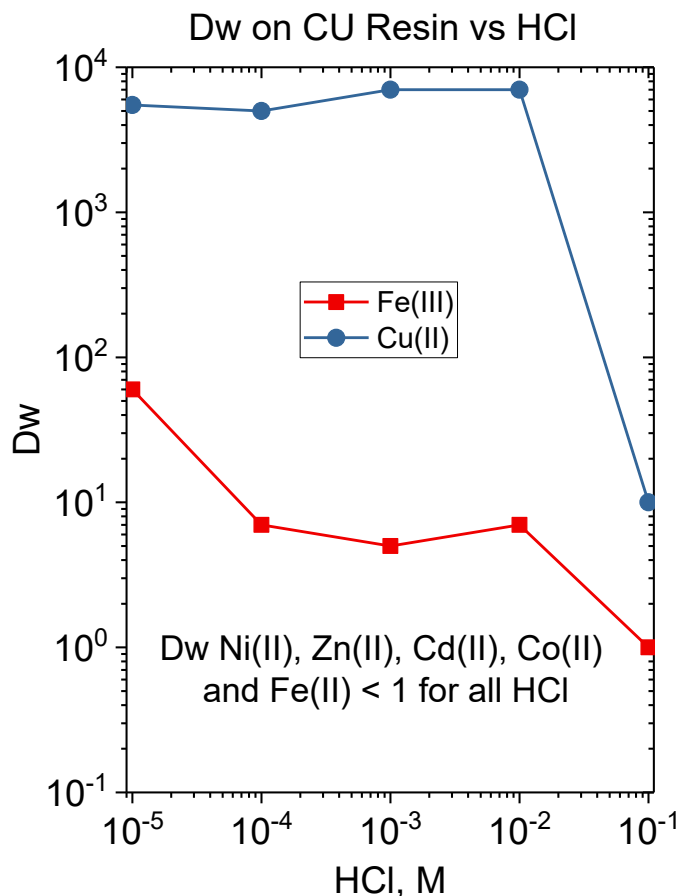


Figure 1. Cu Separation

(1) Dissolve Cu sample in HCl. Evaporate to dryness. Dissolve in 0.001M HCl. Adjust to pH 2-3 as necessary.*

(2) Wet 1 mL CU resin cartridge with 10 mL 2M HCl.



(3) Precondition CU resin with 10 mL 0.01M HCl.

(4) Load sample.

(5) Rinse CU resin with 10 mL 0.01M HCl.

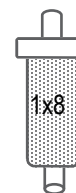
(6) Strip Cu with 2-3 mL 8M HCl.

(7) Precondition 1 mL cartridge of 1x8 with 5 mL 8M HCl.

(8) Load sample from step (6).

(9) Rinse 1x8 with 2 mL 8M HCl.

(10) Strip Cu with 1-3 mL 0.01M HCl.



*Sulfate may also be used and may provide buffering capacity, simplifying the pH adjustment.

References

- 1) C. Dirks, B. Scholten, S. Happel, A. Zulauf, A. Bombard, H. Jungclas, "Characterization of a Cu selective resin and its application to the production of ^{64}Cu ," *J. Radioanal. Nucl. Chem.*, 286, 671-674 (2010).
- 2) Triskem INFOS, No 6, July 2011. http://www.triskem-international.com/scripts/files/59d1f4fc2c2091.54193347/tki6_en_binderonline_1.pdf