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Supplementary information

2 Bio-template assisted synthesis of porous glutaraldehyde-
3 polyethyleneimine particulate resin for selective copper ion binding and
4 recovery

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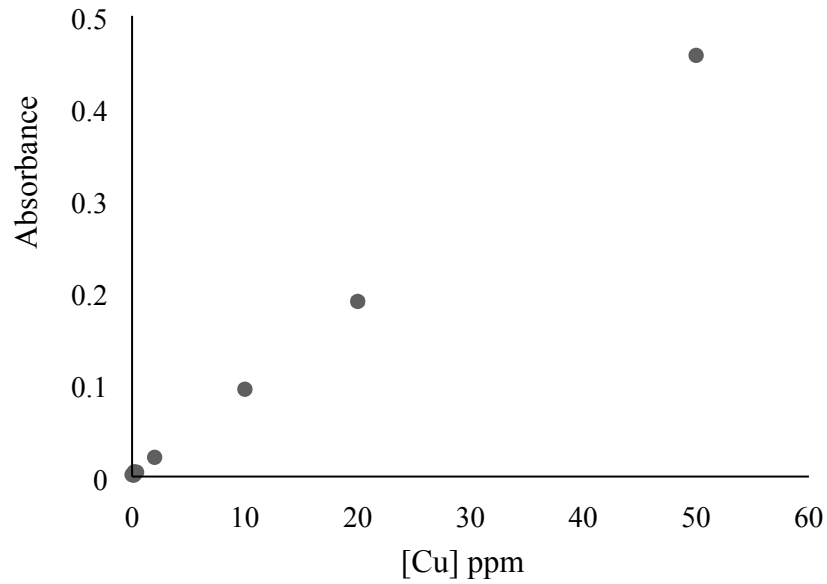
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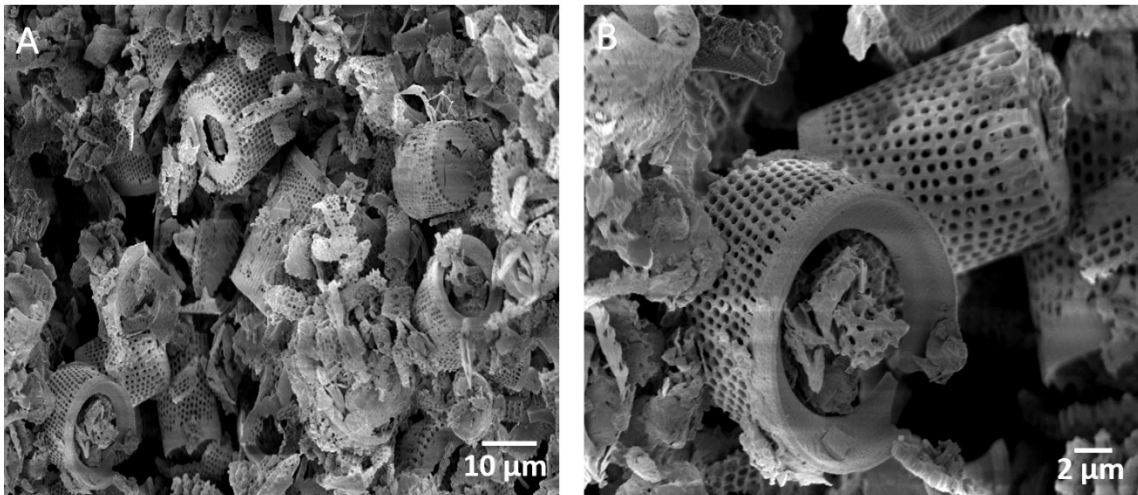
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20 **Fig. S1** Calibration curve indicating absorbance of Cu^{2+} -PEI complex measured at 275 nm
21 mentioned on the Y-axis for the known concentrations of Cu^{2+} in solution mentioned on the X-
22 axis. Error bars indicate (\pm) S.D. between measurements ($n=3$).

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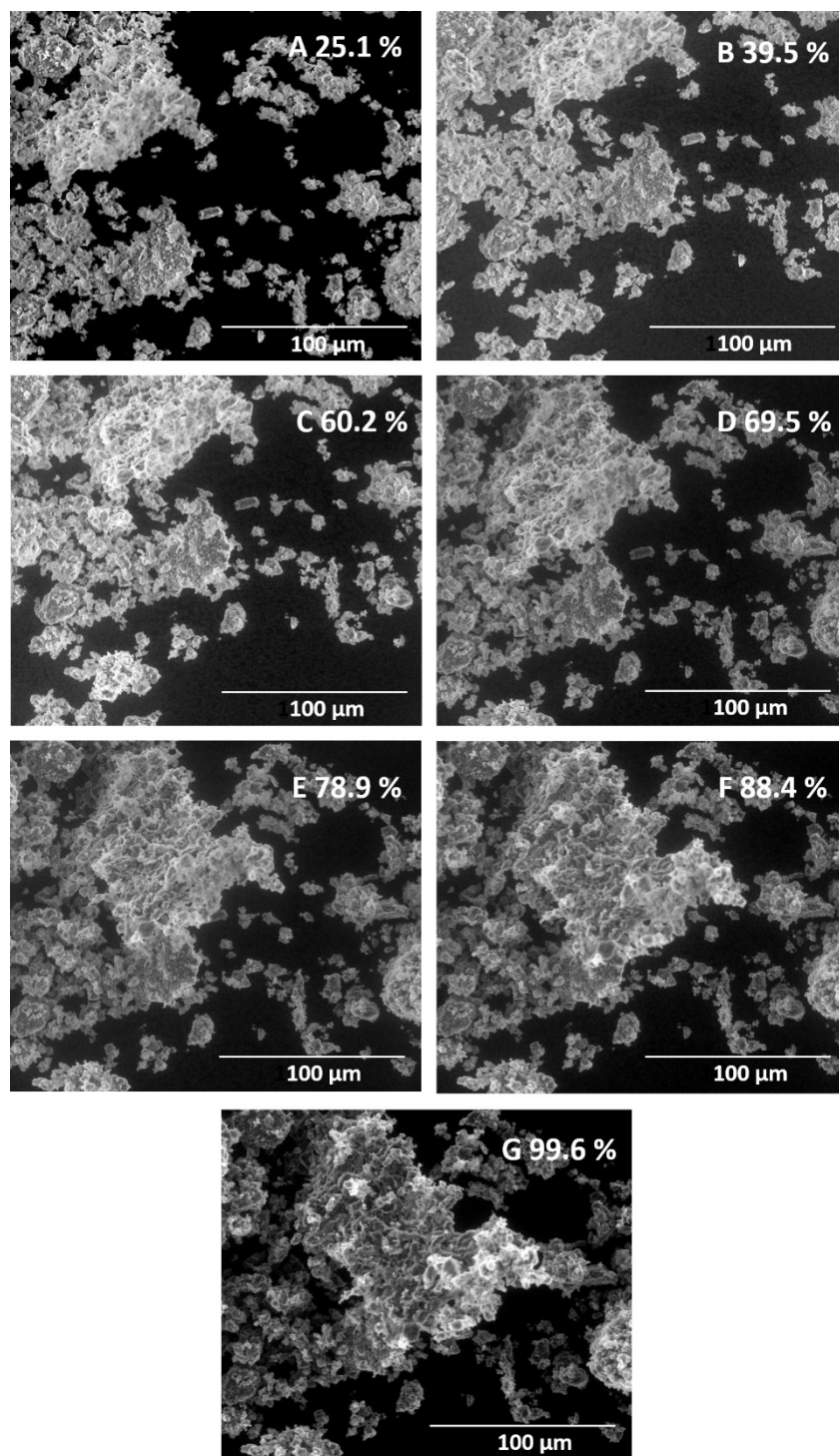


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25 **Fig. S2** Scanning electron micrographs presenting morphology of DE particles at different length
26 scales (A) and (B).

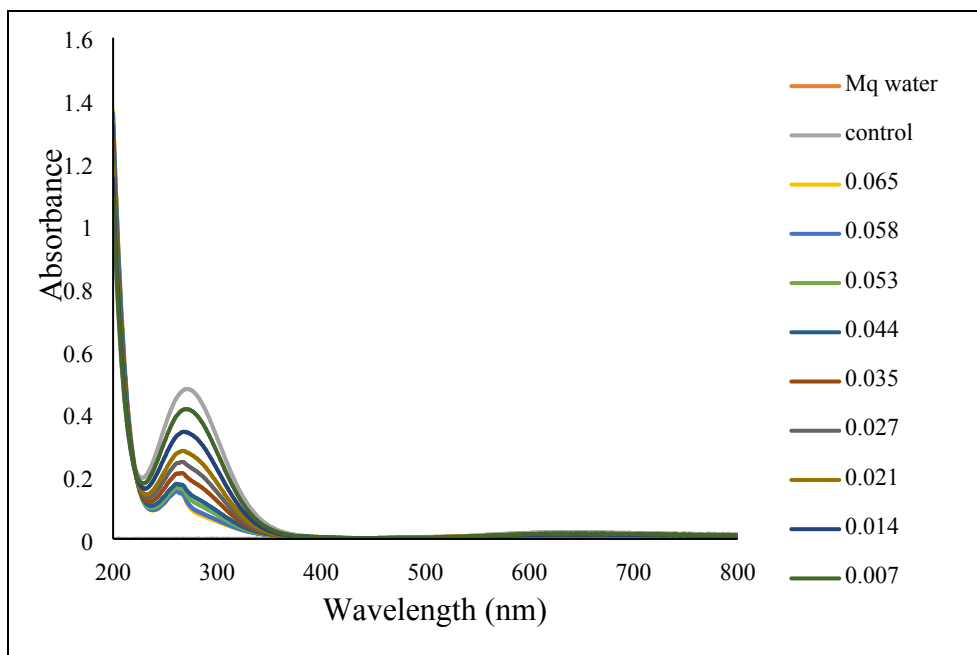
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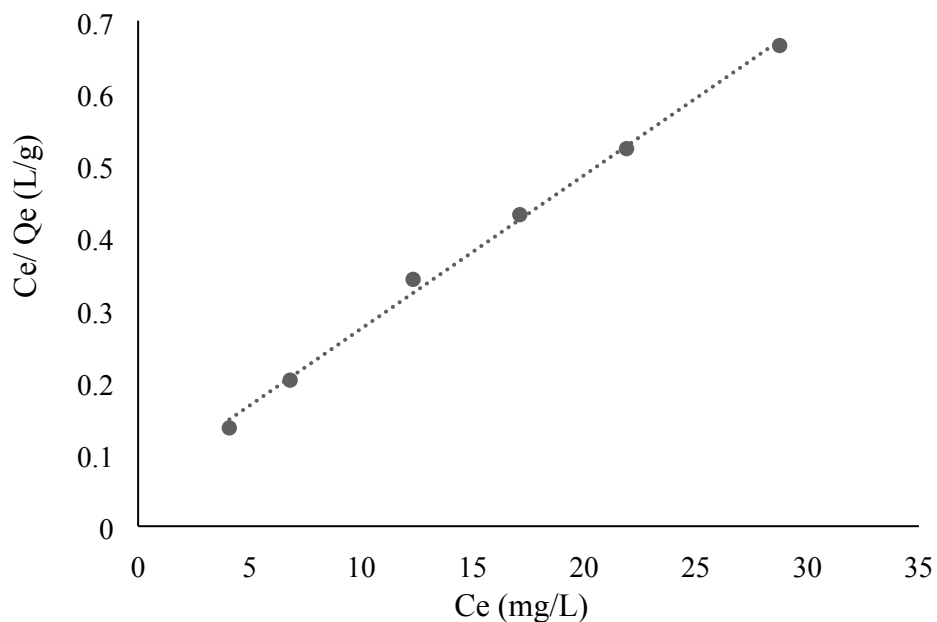
30 **Fig. S3** SEM micrographs showing swelling behavior of GA-PEI resin observed using ESEM under
31 different stages of air moisture % levels indicated.



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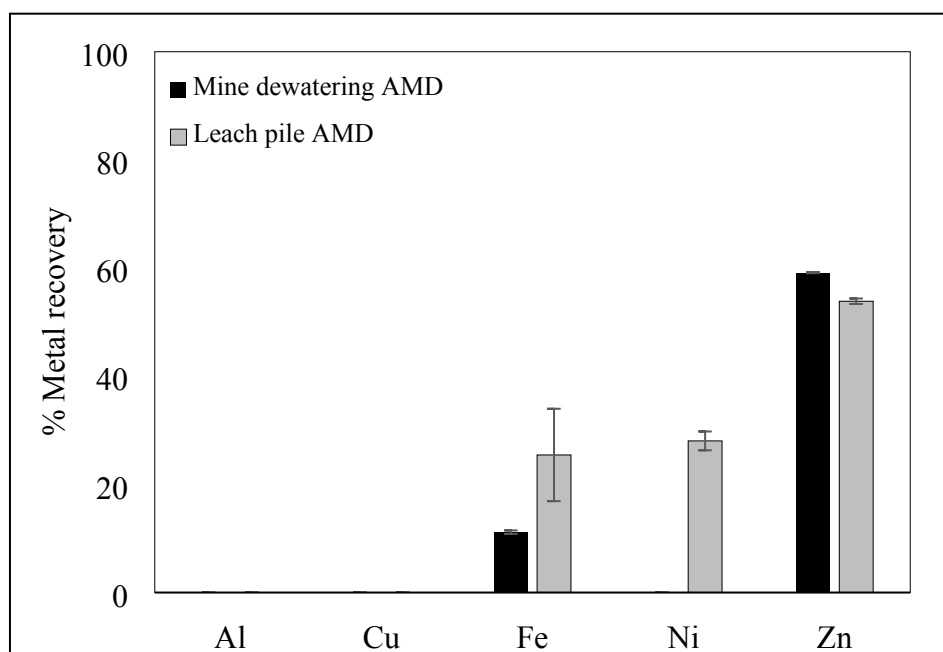
34 **Fig. S4** Absorbance spectra for Cu²⁺ remaining in solution after absorption by Lewatit TP 220
 35 resins indicating distortion of peak at 275 nm. The Fig. legends represent amount of particles (g)
 36 added to 40 ml of solution spiked with 50 mg/L copper ions and control solution refers to the
 37 solution containing copper ions without resins at pH 4.

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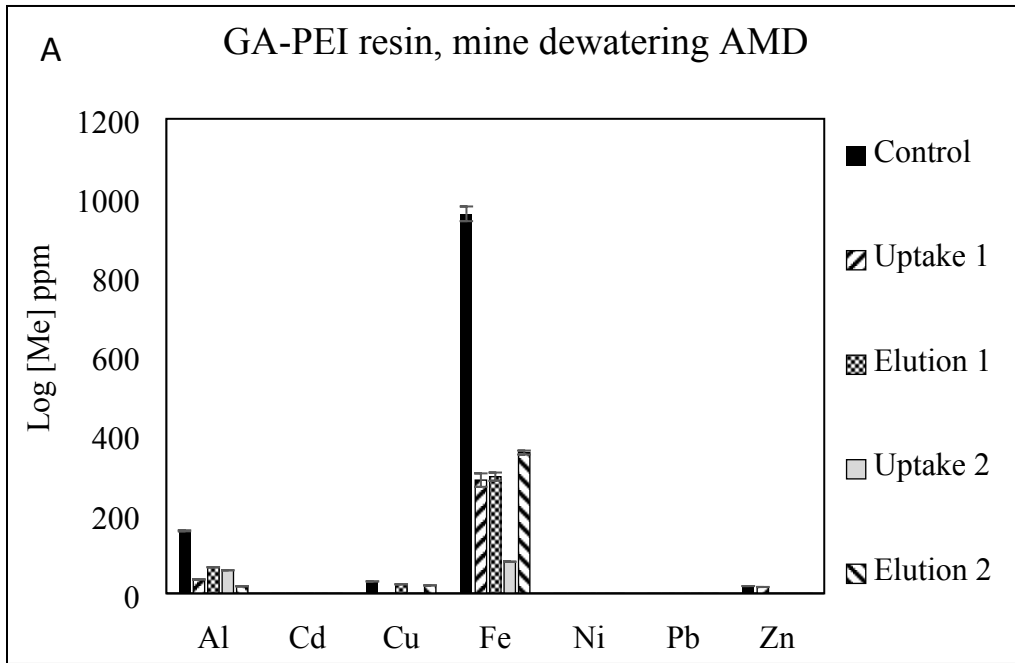
40 **Fig. S5** Plot of C_e/Q_e vs C_e for the Langmuir model of adsorption for Lewatit TP 220 resins. The
 41 absorbance of Cu^{2+} -PEI complex was recorded at 290 nm through UV-Visible spectrophotometer
 42 and data reported as points.



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44 **Fig. S6** Normalized metal percent recovery in centrifuged solutions of mine dewatering AMD
 45 (black) and leach pile AMD (grey) post second elution step for Lewatit TP 220 resins. Error bars
 46 indicate \pm min/max (n=2).

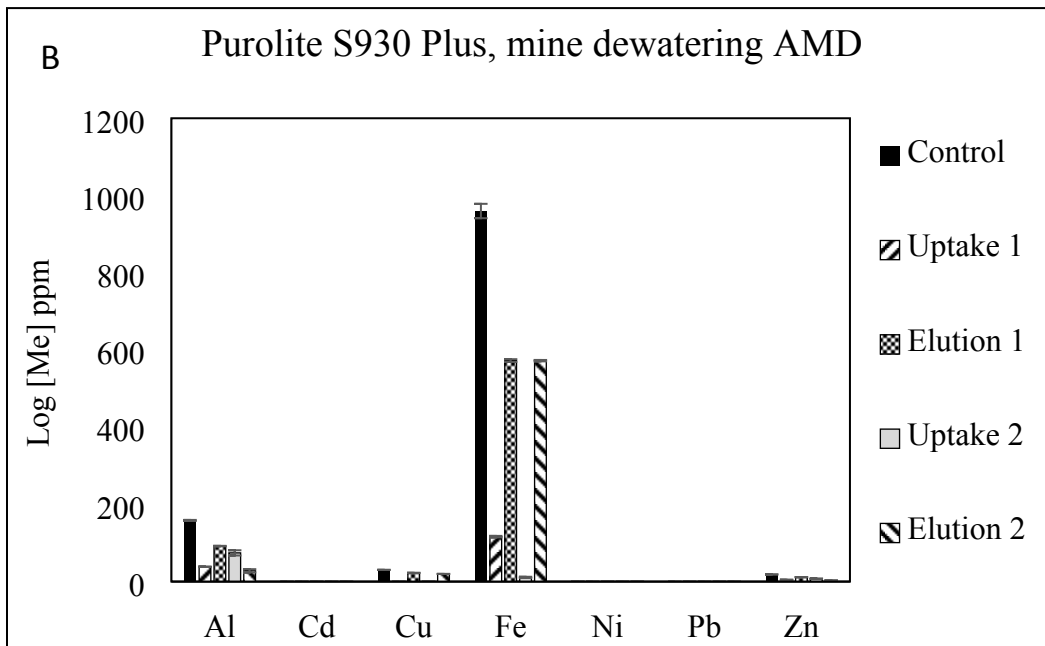
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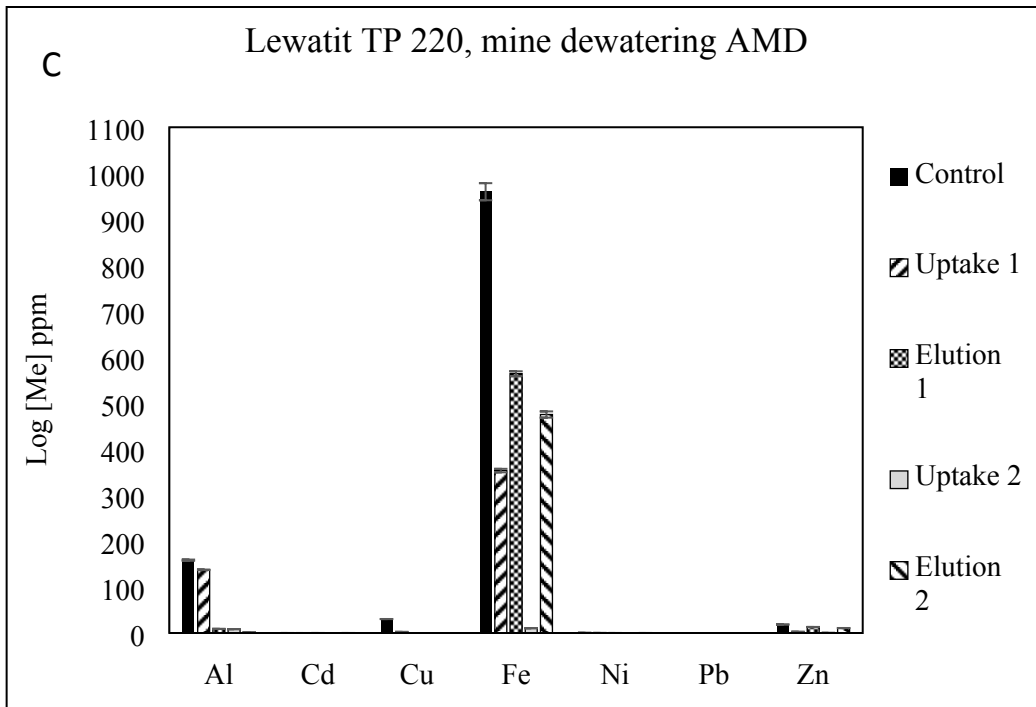
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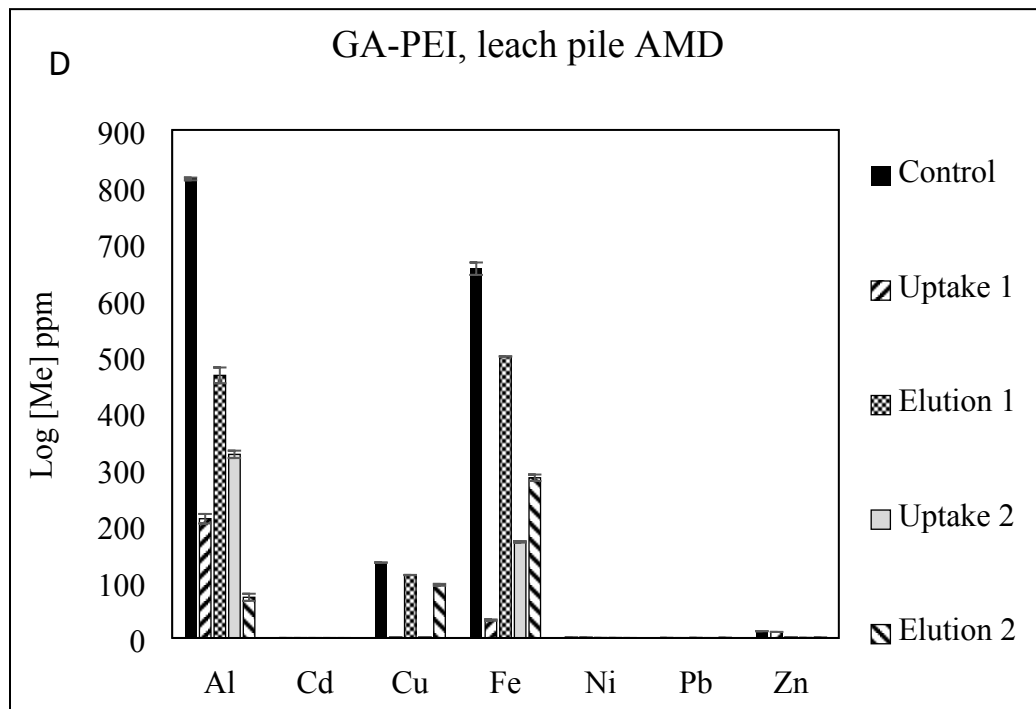
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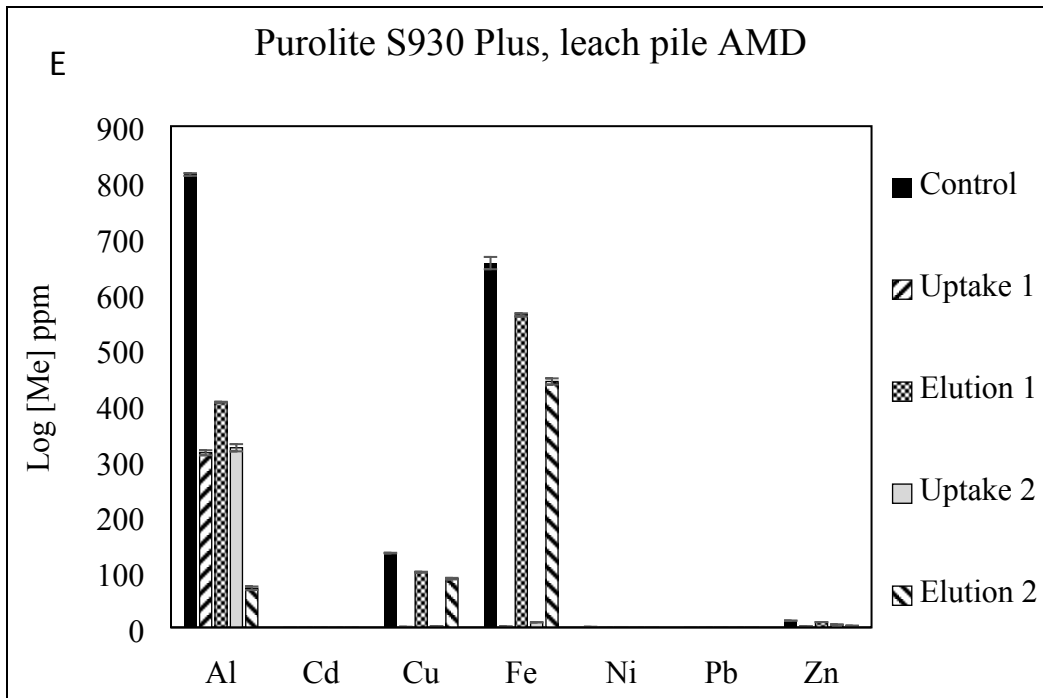
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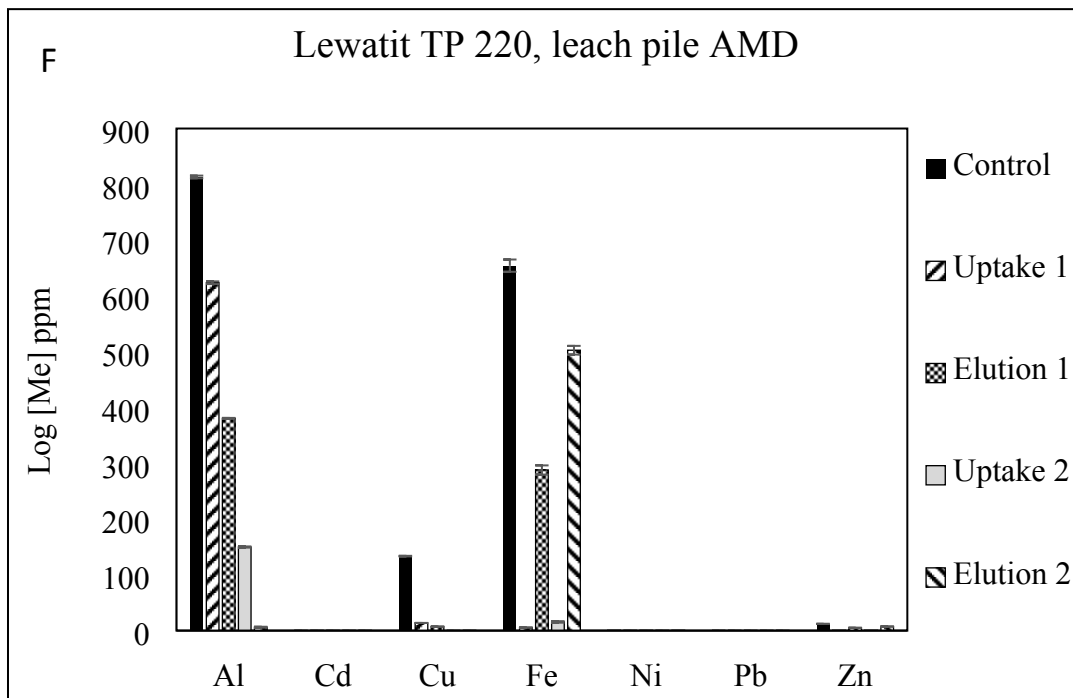
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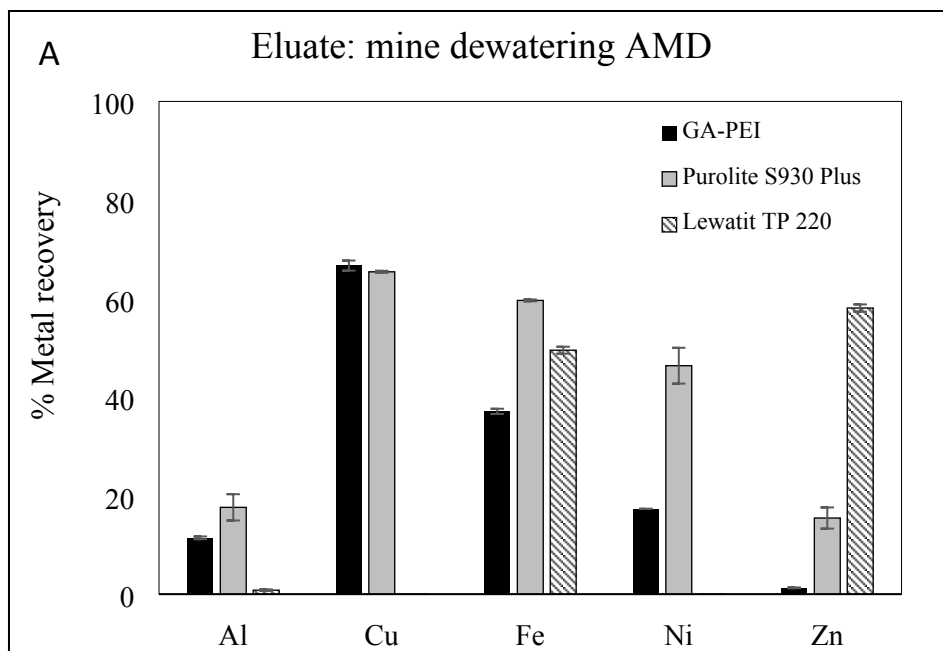


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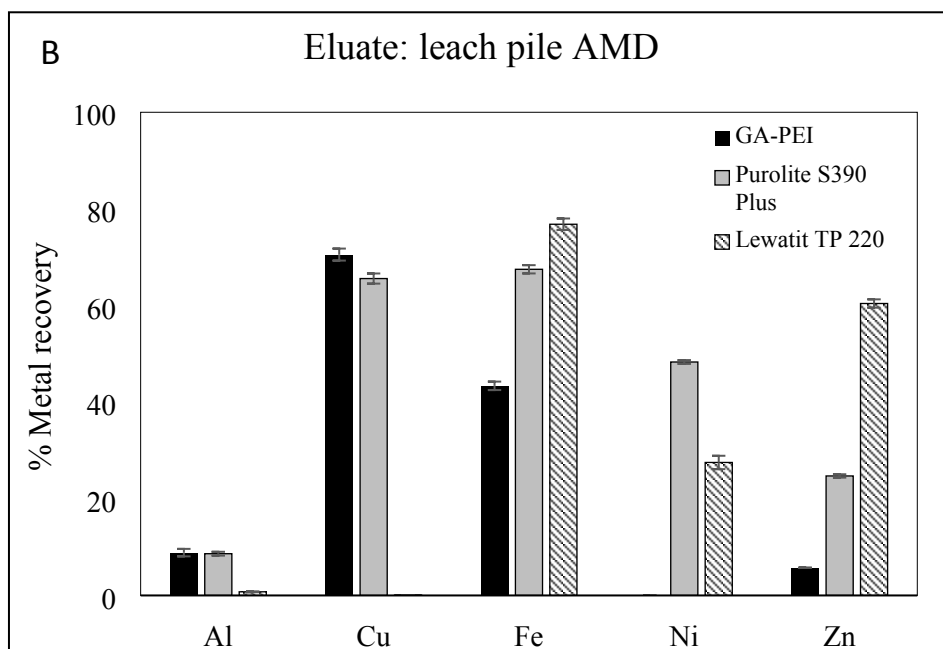


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65 **Fig. S7** Bar graphs showing concentration of metals remaining in solution following
66 uptake/elution cycles in non-centrifuged mine dewatering AMD (A-C) and leach pile AMD (D-F)
67 for all the resins. In legends, control refers to the non-centrifuged MD/LP AMD at pH 4 without
68 resins. Error bars indicate \pm min/max (n=2).



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71 **Fig. S8** Bar graph showing normalized metal percent recovery in non-centrifuged (a) mine
 72 dewatering AMD and (b) leach pile AMD post second elution of metals from resins. Error bars
 73 indicate \pm min/max (n=2).

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