Review: Electrochemistry

Define the following

- Oxidation: A half reaction involving a loss of electrons
- Reduction: A half reaction involving a gain of electrons

Define the following

- Anode: A positively charged electrode
- Cathode- a negatively charged electrode

Determine the Oxidation State

- $K_2\underline{C}O_3$

K	O
+1	2-

- 2(1+) + (N) + 3(-2) = 0
- 2 + N -6 = 0
- N-4=0
- N=+4, therefore C^{4+}

Determine the Oxidation State

- $Li_3\underline{P}O_4$

Li	O
+1	2-

- 3(1+) + (N) + 4(-2) = 0
- 3 + N -8 = 0
- N-5=0
- N=+5, therefore P^{5+}

Determine the Oxidation State

- $Na_2\underline{C}_2O_4$

Na	O
+1	2-

- 2(1+) + 2(N) + 4(-2) = 0
- 2 + 2N -8 = 0
- 2N-6=0
- N=6/2
- N=+3, therefor C^{3+}

Identify oxidized and reduced reagents

- Ionic Equation
- $3Zn_{(s)} + 2Al_{(aq)}^{3+} + 6NO^{1-}_{(aq)} \longrightarrow 3\ Zn_{(aq)}^{2+} + 6NO_3^{1-}{}_{(aq)} + 2Al_{(s)}$

Identify oxidized and reduced reagents

- Net Ionic Equation
- $3Zn_{(s)} + 2Al_{(aq)}^{3+} \longrightarrow 3\,Zn_{(aq)}^{2+} + 2Al_{(s)}$

Zinc LOSES electrons, oxidized

Identify oxidized and reduced reagents

- Net Ionic Equation
- $3Zn_{(s)} + 2Al_{(aq)}^{3+} \longrightarrow 3\,Zn_{(aq)}^{2+} + 2Al_{(s)}$

Zinc LOSES electrons, oxidized

Identify oxidized and reduced reagents

- Net Ionic Equation
- $3Zn_{(s)} + 2Al_{(aq)}^{3+} \longrightarrow 3\,Zn_{(aq)}^{2+} + 2Al_{(s)}$

Aluminum GAINS electrons, reduced

Identify oxidized and reduced reagents

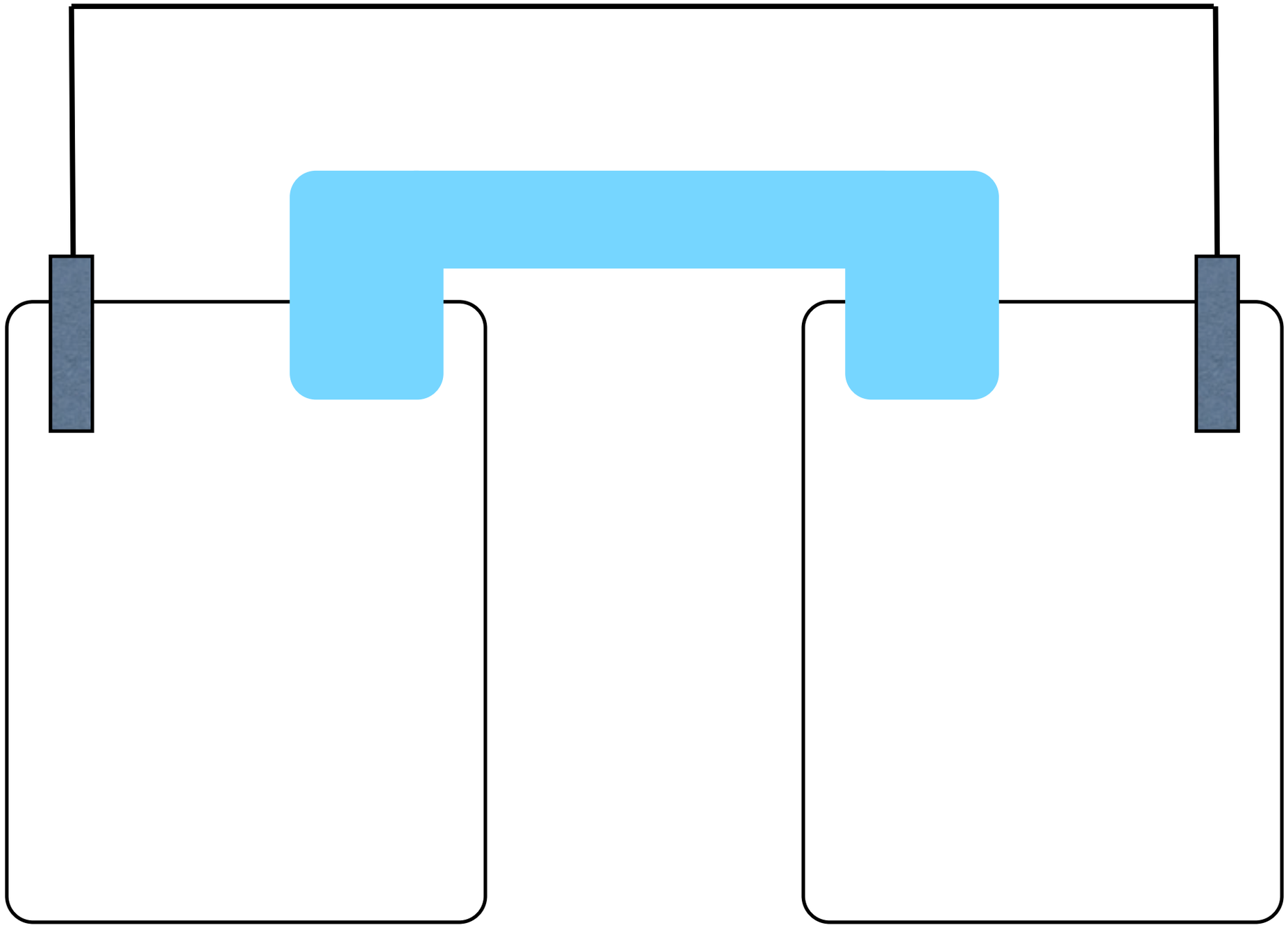
- Net Ionic Equation
- $3Zn_{(s)} + 2Al_{(aq)}^{3+} \longrightarrow 3\ Zn_{(aq)}^{2+} + 2Al_{(s)}$

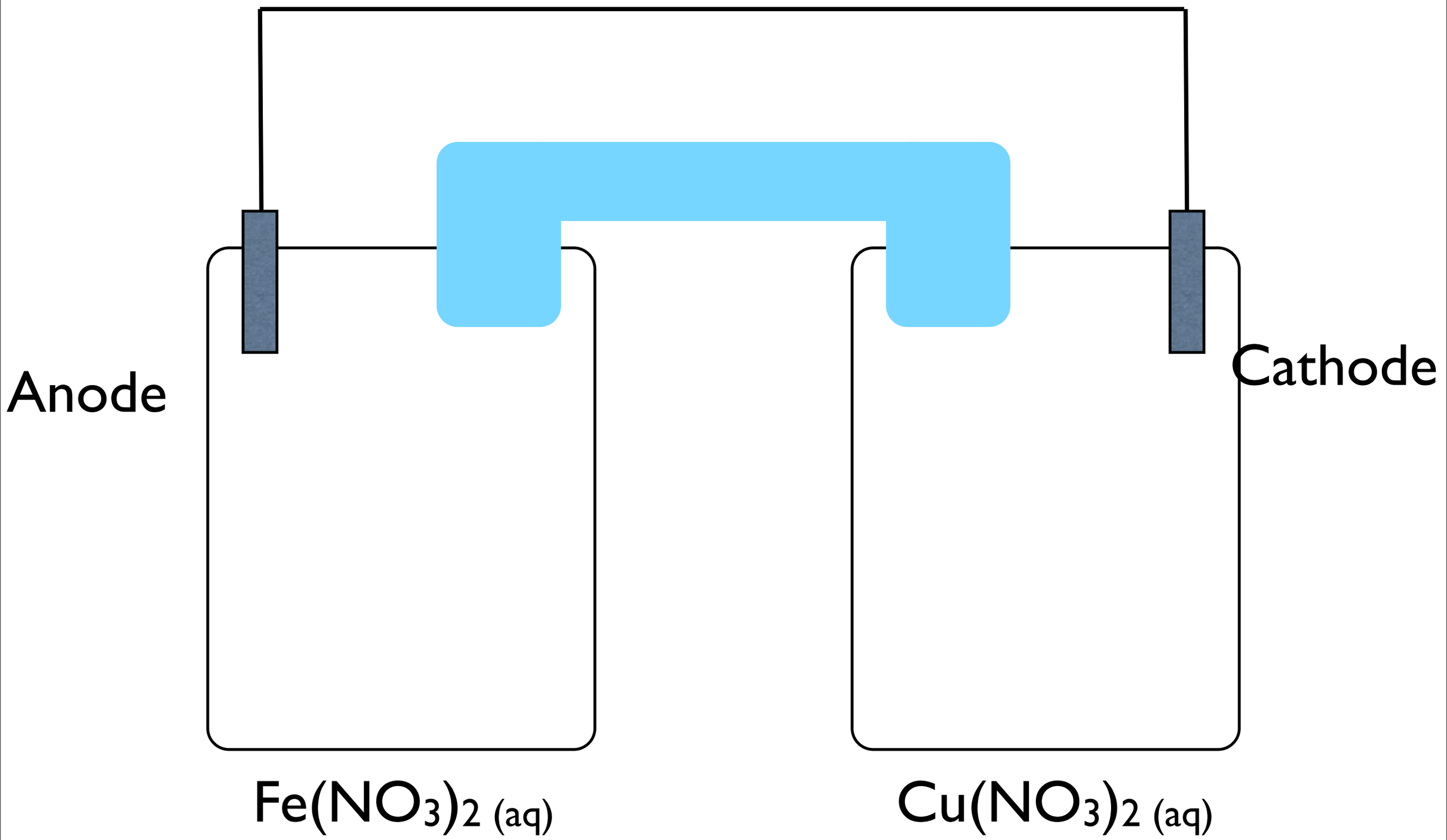
Aluminum GAINS electrons, reduced

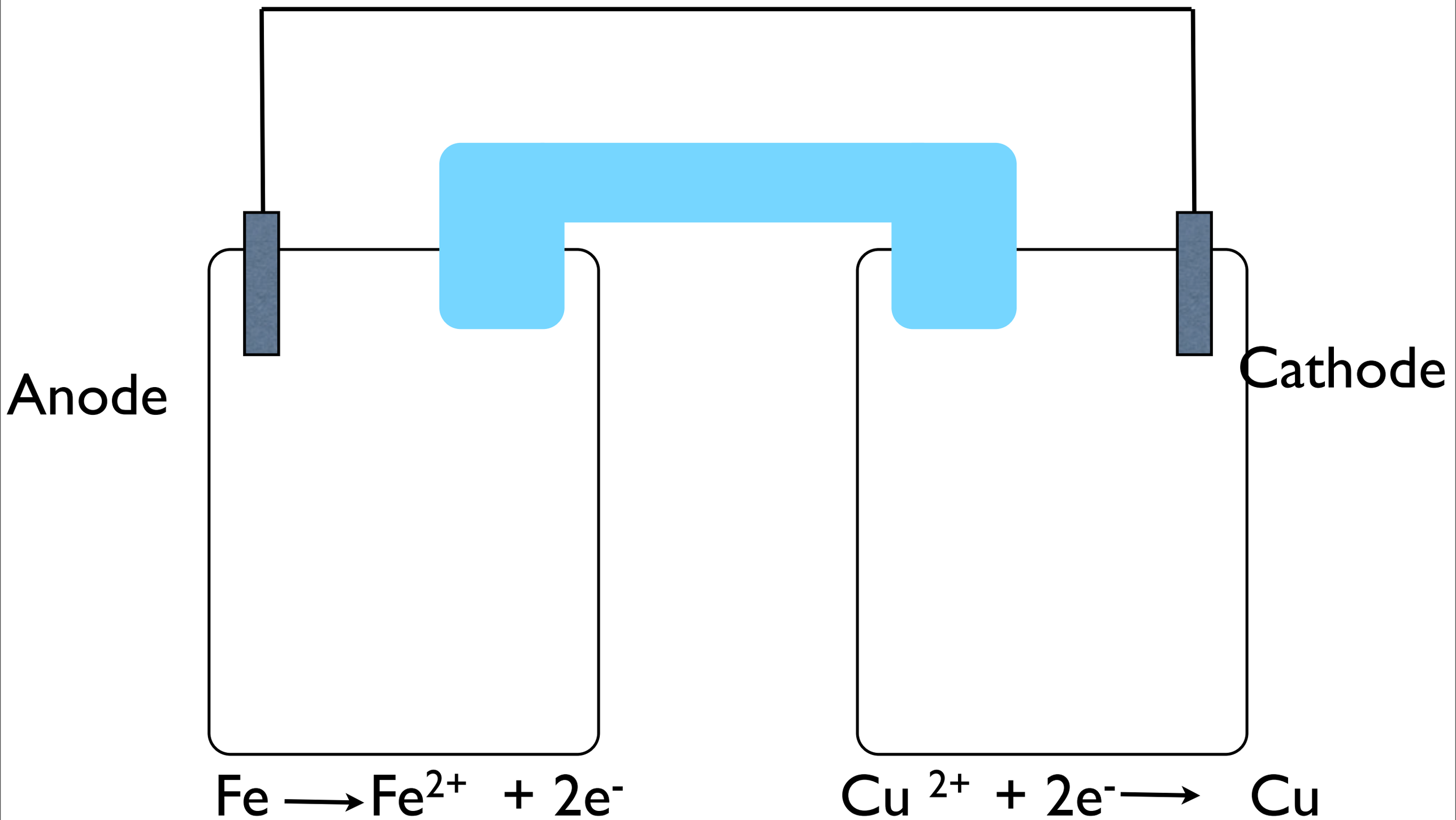
Use the activity series, will a reaction occour

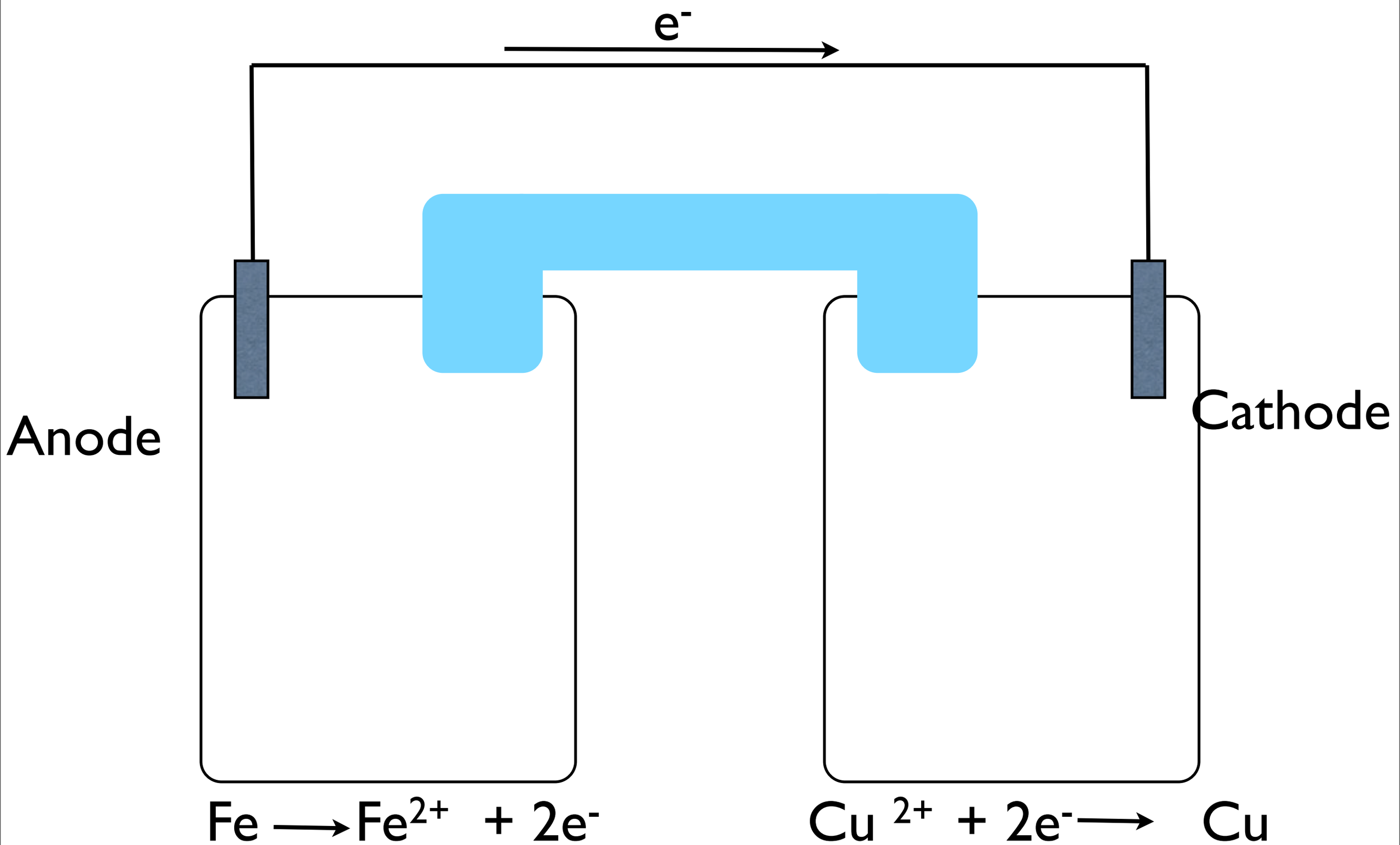
- $Al_{(s)} + 3\ AgNO_{3(aq)} \longrightarrow Al(NO_3)_3 + 3\ Ag_{(s)}$
- $Ag_{(s)} + Zn(NO_3)_{2\ (aq)} \longrightarrow$ NR
- $Cu_{(s)} + Fe(NO_3)_{2\ (aq)} \longrightarrow$ NR

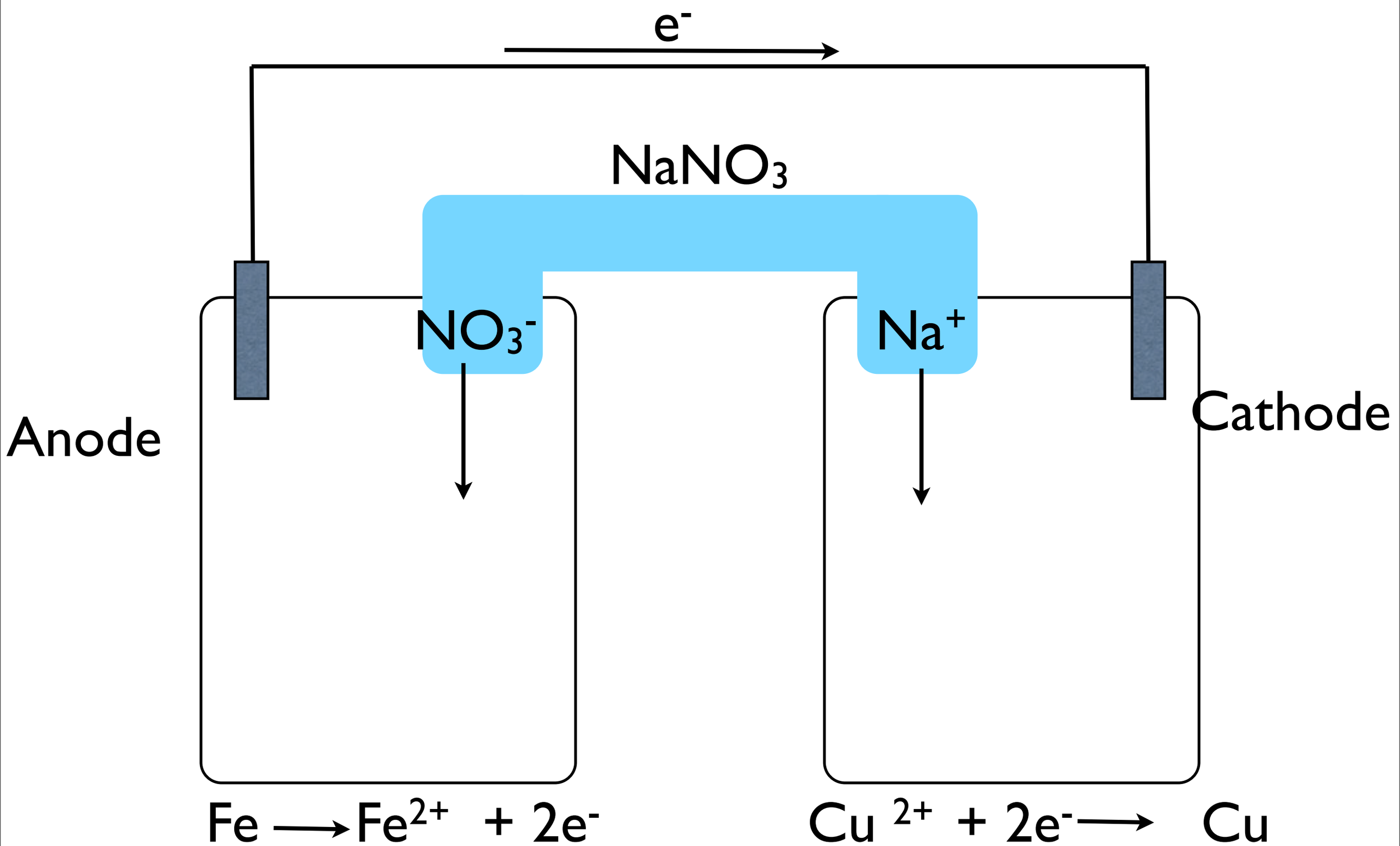
$$Fe_{(s)} + Cu(NO_3)_{2\ (aq)} \longrightarrow Fe(NO_3)_{\ 2\ (aq)} + Cu_{\ (s)}$$




Anode
Cathode
Fe(NO3)2 (aq)
Cu(NO3)2 (aq)


Anode
Cathode
Fe ⟶ Fe2+ + 2e-
Cu 2+ + 2e- ⟶ Cu


e-
Anode
Cathode
Fe ⟶ Fe2+ + 2e-
Cu 2+ + 2e- ⟶ Cu


e-
NaNO3
NO3-
Na+
Anode
Cathode
Fe ⟶ Fe2+ + 2e-
Cu 2+ + 2e- ⟶ Cu