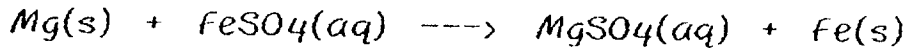


Practice Exercise: Electrochemical Cells

1. Sketch and label an electrochemical cell that makes use of the following spontaneous redox reaction:



- a. Label the anode.

Write the half-reaction that occurs at the anode. $\text{Mg} \rightarrow \text{Mg}^{2+} + 2\text{e}^-$

- b. Label the cathode.

Write the half-reaction that occurs at the cathode. $\text{Fe}^{2+} + 2\text{e}^- \rightarrow \text{Fe}$

- c. This electrochemical cell is joined using a salt bridge containing KNO_3 .

What is the purpose of a salt bridge? To connect the two halves of the cell, allowing ions to migrate through it.

- d. There are spectator ions involved in this process.

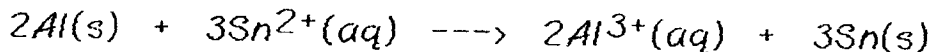
They are SO_4^{2-} , K^+ , NO_3^- .

On your diagram, show the direction in which these

3 ions travel. SO_4^{2-} } move toward anode
 NO_3^- }
 K^+ moves toward cathode

- e. In which direction do Mg^{2+} ions travel? }
In which direction do Fe^{2+} ions travel? } towards the cathode.

2. Aluminum will displace tin from solution according to the following equation:



What would be the individual half-cell reactions if this $\text{Sn}^{2+} + 2\text{e}^- \rightarrow \text{Sn}$ were the cell reaction in an electrochemical cell? $\text{Al} \rightarrow \text{Al}^{3+} + 3\text{e}^-$

Which metal would be the anode and which the cathode?

Al would be anode ; Sn would be cathode .

3. Design an electrochemical cell using Ag as the cathode.

Ag as cathode $\text{Ag}^+ + \text{e}^- \rightarrow \text{Ag}$ with $\text{AgNO}_3(\text{aq})$

Choose any metal reducing agent stronger than Ag (i.e. lower on right side of table)

eg. Cu as anode with $\text{Cu(NO}_3)_2(\text{aq})$

