

Revision video worksheet- electrolysis

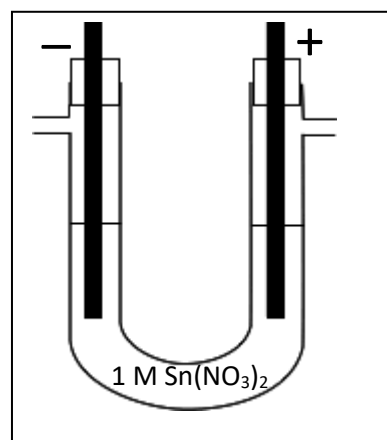
1. Complete for each of the following electrolytic cells with graphite electrodes.

A. Give the reaction taking place at the

- anode _____

- cathode _____

How will the pH at the anode change when the cell is operating.



B. Given that the pH of the solution around

electrode A increases as the cell is allowed to run for 3 minutes, give the reaction taking place at

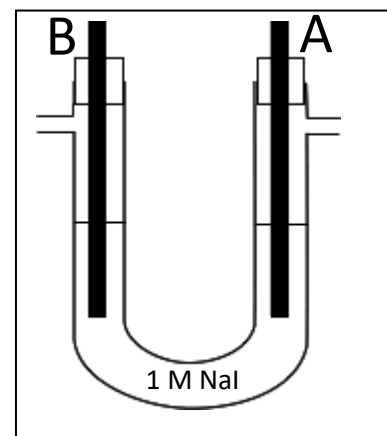
- electrode A _____

- electrode B _____

Give the polarity of each electrode.

A _____

B _____



C. Given that a smell of chlorine was noticed

coming from electrode A give the reaction taking place at

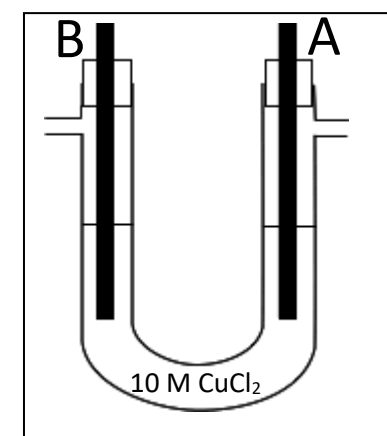
- electrode A _____

- electrode B _____

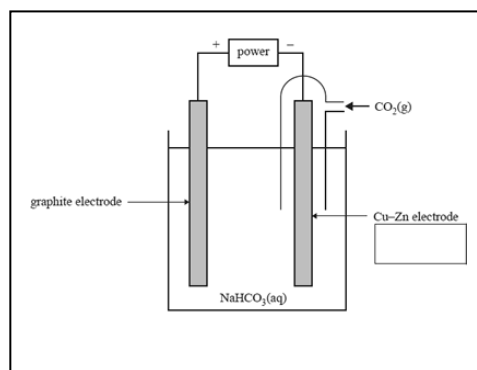
Give the polarity of each electrode.

A _____

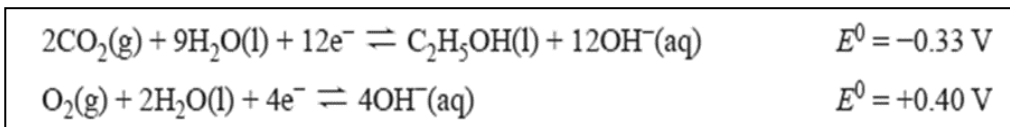
B _____



2. The electrolysis of carbon dioxide gas, CO_2 , in water is one way of making ethanol, $\text{C}_2\text{H}_5\text{OH}$. The diagram below shows a CO_2 - H_2O electrolysis cell. The electrolyte used in the electrolysis cell is sodium bicarbonate solution, $\text{NaHCO}_3(\text{aq})$.

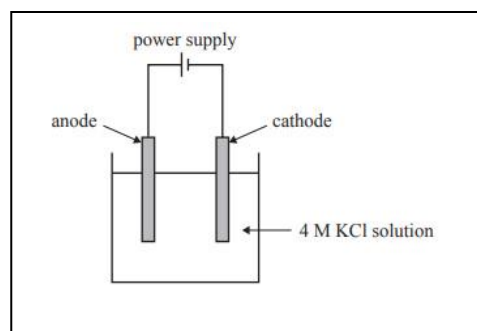


The following half-cell reactions occur in the CO_2 - H_2O electrolysis cell at standard conditions.



- What can be seen being produced at the graphite electrode?
- Identify the Cu-Zn electrode as either the anode or the cathode. Justify your answer.
- Determine the applied voltage required for the electrolysis cell to operate.
- Write the balanced equation for the overall electrolysis reaction, states not required.
- Identify the oxidising agent in the electrolysis reaction. Give your reasoning using oxidation numbers.

3. Potassium hydroxide, KOH , is made commercially by the electrolysis of concentrated potassium chloride, KCl , solution. A chemist aims to make a solution of pure aqueous potassium hydroxide, $\text{KOH}(\text{aq})$, using electrolysis. The electrolysis cell is shown on the right.



- Give the balanced equation to the reaction taking place at the:
 - anode
 - cathode
- Explain why potassium bromide, KBr , or potassium iodide, KI , could not replace KCl as the electrolyte solution, using the cell shown above.