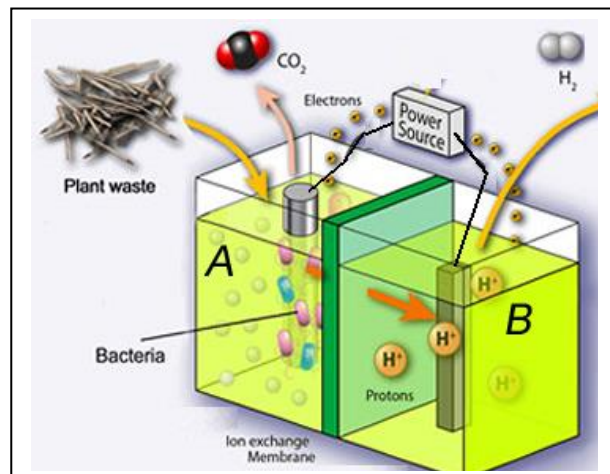


Friday Worksheet

Name:

Electrolysis worksheet 3

- 1) Hydrogen gas can be used as an energy source. Researchers are investigating the production of hydrogen gas in a microbial electrolysis cell. The cell is made up of an anode half-cell and a cathode half-cell. The half-cells are separated by a proton exchange membrane, as shown in the diagram .

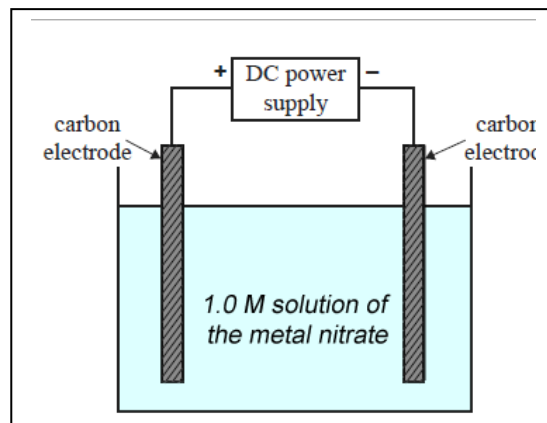


A number of reactions take place in the cell, resulting in the production of hydrogen. Bacteria consume acetic acid, which is produced from fermenting plant matter and release protons, electrons and CO₂. Addition of an electric current enables the protons and electrons to join together to make hydrogen gas and the higher the current, the more hydrogen is produced. Oxygen gas must be excluded from both cells.

- Which cell represents the anode? Explain
- What is the polarity of the electrode in half-cell "A"?
- What is the reaction taking place at the anode?
- What is the reaction taking place at the cathode?
- Give the reaction occurring at the cathode if oxygen gas was present.
- The cell runs for 25.0 minutes at a current of 6.73 A. What volume, in litres, of hydrogen was produced at SLC.

- 2) A series of electrolysis experiments is conducted using the apparatus shown on the right.

An electric charge of 0.140 faraday was passed through separate solutions of 1.0 M Cr(NO₃)₃, 1.0 M Cu(NO₃)₂ and 1.0 M AgNO₃. In each case the corresponding metal was deposited on one of the electrodes.



- What is the polarity of the electrode on which each metal is deposited?
- Calculate the amount, in grams, of each metal deposited.