QUIZIZZ Worksheets

Name

Exploring Electrochemistry Concepts

Total questions: 15

Class

Worksheet time: 8mins

Instructor name: Dr. Ramanathan Saitechinfo

Date

1. What is an electrochemical cell and its components?

a) An electrochemical cell is made up of a resistor and a capacitor.

b) An electrochemical cell consists of two electrodes (anode and cathode), an electrolyte, and a separator.

c) An electrochemical cell has only one type of electrolyte.

d) A battery consists of a single electrode and a conductor.

2. Explain the difference between galvanic and electrolytic cells.

a) Galvanic cells are used in batteries; electrolytic cells are used in light bulbs.

b) Galvanic cells convert chemical energy into thermal energy; electrolytic cells convert thermal energy into chemical energy.

c) Galvanic cells require electricity to operate; electrolytic cells generate electricity spontaneously.

d) Galvanic cells generate electricity from spontaneous reactions; electrolytic cells require electricity to drive non-spontaneous reactions.

3. What is the Nernst equation and its significance in electrochemistry?

a) The Nernst equation is $E = E° - (RT/nF)\ln(Q)$ and is significant for calculating cell potentials under non-standard conditions.

b) The Nernst equation is used to calculate reaction rates.

c) The Nernst equation is irrelevant in electrochemistry.

d) The Nernst equation is $E = E° + (RT/nF)\ln(Q)$ for standard conditions.

4. Describe the process of electrolysis and its applications.

a) Electrolysis is only applicable in the textile industry.

b) Electrolysis is a method of painting surfaces.

c) Electrolysis is used in various applications including electroplating, metal extraction, water splitting for hydrogen production, and the purification of metals.

d) Electrolysis is primarily used for cooking food.

5. What are redox reactions and how do they occur?

a) Redox reactions are limited to reactions in acidic solutions only.

b) Redox reactions do not involve any changes in oxidation states.

c) Redox reactions only involve the formation of new compounds without electron transfer.

d) Redox reactions are chemical reactions where one substance is oxidized and another is reduced, involving the transfer of electrons.

6. Define standard electrode potential and its importance.

a) Standard electrode potential is a measure of the potential of a reversible electrode at standard conditions, crucial for predicting redox reaction feasibility and calculating cell potentials.

b) Standard electrode potential is irrelevant to electrochemical cells.

c) Standard electrode potential is the voltage of a battery under load.

d) Standard electrode potential measures the temperature of a chemical reaction.

7. How do you calculate the cell potential of an electrochemical cell?

a) $E_{cell} = E°_{cell} - (nF/RT) * \ln(Q)$

b) $E_{cell} = E°_{cell} - (RT/nF) * \ln(Q)$

c) $E_{cell} = E°_{cell} + (RT/nF) * \ln(Q)$

d) $E_{cell} = E°_{cell} + (nF/RT) * \ln(Q)$

8. What factors affect the rate of electrolysis?

a) Size of the container holding the electrolyte

b) Time of day when electrolysis is performed

c) Factors affecting the rate of electrolysis include electrolyte type, concentration, temperature, electrode surface area, applied voltage, and electrode material.

d) Type of light used during the process

9. Explain the role of electrodes in electrochemical cells.

a) Electrodes facilitate oxidation and reduction reactions, generating electric current in electrochemical cells.

b) Electrodes are used to store energy in batteries.

c) Electrodes prevent chemical reactions from occurring.

d) Electrodes only serve as connectors in circuits.

10. What is the significance of the salt bridge in a galvanic cell?

a) The salt bridge prevents ion flow to maintain charge separation.

b) The salt bridge is used to generate heat in the cell.

c) The salt bridge allows ion flow to maintain charge balance and enables continuous electron flow.

d) The salt bridge acts as a barrier to stop electron flow.

11. How can the Nernst equation be used to determine concentration?

a) The Nernst equation is used to determine temperature from concentration.

b) Use the Nernst equation to calculate concentration from known cell potential and other concentrations.

c) The Nernst equation calculates pressure based on volume and temperature.

d) The Nernst equation provides a method to measure electrical resistance directly.

12. List some common applications of electrochemistry in daily life.

a) Solar panels

b) Hydraulic systems

c) Wind turbines

d) Batteries, electroplating, corrosion prevention, electrolysis.

13. What is the relationship between Gibbs free energy and cell potential?

a) $\Delta G = -nFE$; a negative ΔG indicates a positive cell potential.

b) $\Delta G = nFE$; a positive ΔG indicates a negative cell potential.

c) $\Delta G = -nFE$; cell potential has no relation to ΔG.

d) $\Delta G = 0$; cell potential is always zero.

14. Describe how electrochemistry is used in batteries.

a) Electrochemistry is used in batteries to store electrical energy without any chemical reactions.

b) Batteries use electrochemistry to convert thermal energy into mechanical energy.

c) Electrochemistry in batteries involves only the movement of electrons without any chemical changes.

d) Electrochemistry is used in batteries to convert chemical energy into electrical energy through oxidation and reduction reactions at the electrodes.

15. What is the role of a cathode and anode in electrochemical reactions?

a) The anode is where reduction occurs and gains electrons.

b) The anode is where oxidation occurs and loses electrons, while the cathode is where reduction occurs and gains electrons.

c) Both the anode and cathode are sites of oxidation.

d) The anode gains electrons while the cathode loses electrons.

Answer Keys

1. b) An electrochemical cell consists of two electrodes (anode and cathode), an electrolyte, and a separator.
2. d) Galvanic cells generate electricity from spontaneous reactions; electrolytic cells require electricity to drive non-spontaneous reactions.
3. a) The Nernst equation is $E = E° - (RT/nF)\ln(Q)$ and is significant for calculating cell potentials under non-standard conditions.
4. c) Electrolysis is used in various applications including electroplating, metal extraction, water splitting for hydrogen production, and the purification of metals.
5. d) Redox reactions are chemical reactions where one substance is oxidized and another is reduced, involving the transfer of electrons.
6. a) Standard electrode potential is a measure of the potential of a reversible electrode at standard conditions, crucial for predicting redox reaction feasibility and calculating cell potentials.
7. b) $E_{cell} = E°_{cell} - (RT/nF) * \ln(Q)$
8. c) Factors affecting the rate of
9. a) Electrodes facilitate

electrolysis include electrolyte type, concentration, temperature, electrode surface area, applied voltage, and electrode material.

oxidation and reduction reactions, generating electric current in electrochemical cells.

10. c) The salt bridge allows ion flow to maintain charge balance and enables continuous electron flow.

11. b) Use the Nernst equation to calculate concentration from known cell potential and other concentrations.

12. d) Batteries, electroplating, corrosion prevention, electrolysis.

13. a) ΔG = -nFE; a negative ΔG indicates a positive cell potential.

14. d) Electrochemistry is used in batteries to convert chemical energy into electrical energy through oxidation and reduction reactions at the electrodes.

15. b) The anode is where oxidation occurs and loses electrons, while the cathode is where reduction occurs and gains electrons.