

Exercise 8.71 – Electrolysis of aqueous solutions

Q871-01 Which statement is correct about the electrolysis of copper (II) sulphate solution using graphite electrodes?

- A. A colourless gas is produced at the negative electrode
- B. The electrolyte does not change colour
- C. The negative electrode decreases in mass
- D. A colourless gas is produced at the positive electrode

Q871-02 Consider the following statements regarding electrolysis of molten lead (II) bromide.

- I Oxidation takes place at the anode where lead ions gain electrons
- II Reduction takes place at the cathode where lead ions gain electrons
- III Oxidation takes place at the anode where bromide ions lose electrons
- IV Reduction takes place at the cathode where bromide ions lose electrons

Which of the above statements are correct?

- A. I and II only
- B. I and IV only
- C. II and III only
- D. II and IV only

Q871-03 Two moles of electrons are passed through an electrolytic cell containing molten sodium chloride. The same charge is passed through a second cell containing aqueous sodium chloride. In both cells the electrodes are made of platinum. Which statement is correct?

- A. One mole of sodium metal will be formed in the first cell
- B. Chlorine gas will be formed at the cathodes of both cells
- C. One mole of hydrogen gas will be formed in the second cell
- D. One mole of oxygen gas will be formed at the anode of the second cell

Q871-04 Which statement is correct?

- A. Spontaneous redox reactions produce electricity in an electrolytic cell.
- B. Electricity is used to carry out a non-spontaneous redox reaction in a voltaic cell
- C. Oxidation takes place at the negative electrode in a voltaic cell and the positive electrode in an electrolytic cell
- D. Oxidation takes place at the negative electrode in a voltaic cell and reduction takes place at the positive electrode in an electrolytic cell

Q871-05 Aqueous solutions of AgNO_3 , $\text{Cu}(\text{NO}_3)_2$ and $\text{Cr}(\text{NO}_3)_3$ are electrolysed using the same quantity of electricity. How do the number of moles of metals formed compare?

- A. $\text{Ag} = \text{Cu} = \text{Cr}$
 - B. $\text{Ag} > \text{Cu} > \text{Cr}$
 - C. $\text{Ag} < \text{Cu} < \text{Cr}$
 - D. $\text{Cu} > \text{Ag} > \text{Cr}$
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Q871-06 What are the products formed at the cathode and anode respectively when dilute hydrochloric acid and dilute nitric acid are electrolysed?

- A. nitric acid: nitrogen and oxygen. hydrochloric acid: hydrogen and oxygen
 - B. nitric acid: hydrogen and oxygen. hydrochloric acid: hydrogen and oxygen
 - C. nitric acid: hydrogen and oxygen. hydrochloric acid: hydrogen and chlorine
 - D. nitric acid: nitrogen and oxygen. hydrochloric acid: hydrogen and chlorine
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Q871-07 Suggest three observations that may be made when aqueous copper (II) chloride is electrolysed using graphite electrodes.

Q871-08 What is left behind in the solution when a solution of copper (II) sulphate(aq) is electrolysed until there is no further deposition of copper at the cathode?

Q871-09 In the electrolysis of dilute sulphuric acid, if 25cm^3 of oxygen are liberated at the anode. How much hydrogen is liberated at the cathode?

Q871-10 During the electrolysis of potassium iodide solution, some universal indicator is added to the solution. Suggest any colour changes that may be observed around the electrodes.
