

Chem12 Electrolysis : Quiz - 55

- 1) What is electrolysis?
- 2)a) During electrolysis, why should electrodes be inert?
b) Give two examples of substances that are used in inert electrodes.
- 3) For the electrolysis of the molten salts below, give the anode and cathode half-reactions and the minimum voltage necessary to carry out the reaction :
 - a) NaCl
 - b) MgCl₂
 - c) CrF₃
- 4) Give an advantage of doing electrolysis on an aqueous solution.
- 5) Give the anode and cathode half-reactions and the minimum voltage required for electrolysis of the following aqueous solutions :
 - a) AlCl₃(aq)
 - b) CuSO₄(aq)
 - c) MgF₂(aq)
 - d) NiI₂(aq)

Answers : 1) It is the input of electrical energy that will cause a non-spontaneous redox reaction to proceed. 2)a) It is to prevent the electrodes from reacting., b) carbon, platinum, 3)a) anode; $2\text{Cl}^- \rightarrow \text{Cl}_2$

+ 2e⁻, cathode; Na⁺ + e⁻ -> Na, +4.07 V, b) anode; 2Cl⁻ -> Cl₂ + 2e⁻, cathode; Mg²⁺ + 2e⁻ -> Mg, +3.73 V, c) anode; 2F⁻ -> F₂ + 2e⁻, cathode; Cr³⁺ + 3e⁻ -> Cr, +3.61 V, 4) low temperature, 5)a) anode; 2Cl⁻ -> Cl₂ + 2e⁻, cathode; 2H₂O + 2e⁻ -> H₂ + 2OH⁻ (10⁻⁷ M) 1.77 V, b) anode; 2H₂O -> O₂ + 4H⁺ (10⁻⁷ M) + 4e⁻, cathode; Cu²⁺ + 2e⁻ -> Cu, 0.48 V, c) anode; 2H₂O -> O₂ + 4H⁺ (10⁻⁷ M) + 4e⁻, cathode; 2H₂O + 2e⁻ -> H₂ + 2OH⁻ (10⁻⁷ M) +1.23 V, d) anode, 2I⁻ -> I₂ + 2e⁻, cathode; Ni²⁺ + 2e⁻ -> Ni, +0.80 V.