



Chem!stry

Name: ()

Class:

Date: / /

Electrochemistry – Ionic Half-Equations

Write ionic half-equations to describe the chemistry taking place at the anode and the cathode when each of the following substances is electrolysed.

Remember, in general:

- Negative ions (anions) are attracted towards the positive electrode (anode) where they are oxidised.
- Positive ions (cations) are attracted towards the negative electrode (cathode) where they are reduced.

Remember, for aqueous solutions:

- In addition to ions of the solute, aqueous solutions also contain $\text{H}^+(\text{aq})$ and $\text{OH}^-(\text{aq})$ ions due to ionisation of the water molecules.
- If the solute contains a cation of a metal that is *above* hydrogen in the electrochemical series, *hydrogen* is preferentially discharged at the cathode.
- If the solute contains a cation of a metal that is *below* hydrogen in the electrochemical series, the *metal* is preferentially discharged at the cathode.
- At the anode, $\text{OH}^-(\text{aq})$ is preferentially oxidised unless the solution is a concentrated $\text{Cl}^-(\text{aq})$, $\text{Br}^-(\text{aq})$, or $\text{I}^-(\text{aq})$. Other ions, such as $\text{CO}_3^{2-}(\text{aq})$, $\text{NO}_3^-(\text{aq})$ and $\text{SO}_4^{2-}(\text{aq})$ are not normally oxidised.

1) Molten sodium chloride – $\text{NaCl}(l)$

- Anode:
- Cathode:

2) Molten lead(II) iodide – $\text{PbI}_2(l)$

- Anode:
- Cathode:

3) Molten silver bromide – $\text{AgBr}(l)$

- Anode:
- Cathode:

- 4) Molten aluminium oxide – $Al_2O_3(l)$
- Anode:
 - Cathode:
- 5) Water – $H_2O(l)$
- Anode:
 - Cathode:
- 6) Dilute aqueous sodium chloride – $NaCl(aq)$
- Anode:
 - Cathode:
- 7) Aqueous Copper(II) sulphate – $CuSO_4(aq)$
- Anode:
 - Cathode:
- 8) Concentrated hydrochloric acid – $HCl(aq)$
- Anode:
 - Cathode:
- 9) Aqueous silver nitrate – $AgNO_3(aq)$
- Anode:
 - Cathode:
- 10) Dilute sulphuric acid – $H_2SO_4(aq)$
- Anode:
 - Cathode:

- Scan the QR code given below to view the answers to this assignment.



http://www.chemist.sg/electro_chem/ionic_half_equations_ans.pdf