Key points to learn

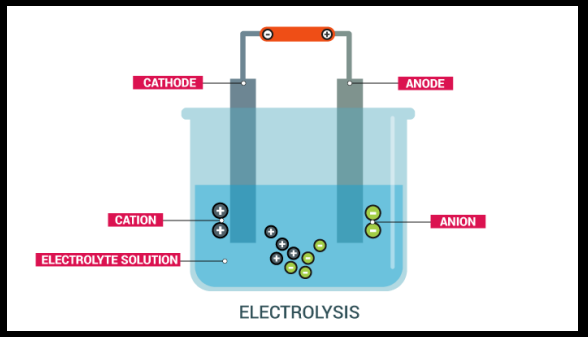
1. What is electrolysis ?	**Electrolysis** breaks down compounds into different elements using electricity that passes through a molten or aqueous ionic compound.
2. Electrodes	**Electrodes** are made out of graphite or platinum and they are inert (so they don't react with the elements)
	• **Cathode:** which is negative (attracts positive cations) • **Anode:** which is positive (attracts negative anions)
3. Electrolysis of molten compounds	An Ionic compound can conduct electricity when its molten or liquid because it has free moving electrons. • The product at the cathode will be a metal • The product at the anode will be a non-metal apart from hydrogen
	• **Example Lead bromide (PbBr2):** • Lead is Pb2+ so it will migrate to the cathode. • 2Br- is negative so it migrates to the anode.
4. Half equations	$Pb^{2+}(l) + 2e^- \rightarrow Pb(l)$ For the lead at the cathode $2Br^-(l) \rightarrow Br_2(g) + 2e^-$ For the bromine at the anode

Key points to learn

5. Electrolysis of solution:	Ionic compounds are very energy-intensive in solution. Predicting the products at the electrodes is different as there's is H2O in the solution.
6. water at the anode	when water is at the cathode it will be reduced as it gains electrons. $2H_2O(l) + 2e^- \rightarrow 2OH^-(aq) + H_2(g)$
7. Water at the cathode	• The water be oxidised (loses electrons) • The water will break making 4 types of ions present in the solution. • Only one species can react at each electrode $2H_2O(l) \rightarrow O_2(g) + 4H^+(aq) + 4e^-$
8. Rules for the cathode:	• If + ions are group 1,2, aluminium, or acids then hydrogen will be produced. • If +ions are less reactive than hydrogen, the metal will be produced.
9. Rules for the anode:	• If -ions are halogens then the halogens will be produced. • If -ions are not a halogen then oxygen will be produced.
10. When the electrodes are the same as solution at the anode e.g. copper.	• Electrodes of copper and a solution of a copper compound) • The metal anode will lose mass because copper atoms will change into copper ions and go into solution.

Elements of the Sea

Electrolysis knowledge organiser



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