Electrode potentials & cells Knowledge organiser

1. Key vocabulary

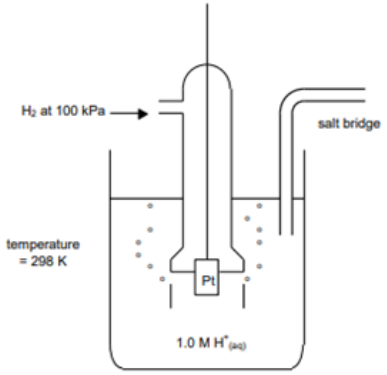
Potential difference	The difference in voltage between two points.
Electrode potential E°	The is the potential difference of a cell built of two electrodes: on the left-hand side of the cell diagram is the standard hydrogen electrode (SHE), and. on the right-hand side is the electrode in question under standard conditions (1mol dm^{-3}, 100kpa, 298k)
Standard hydrogen electrode (SHE)	The electrode given the electrode potential of 0.00v to establish all other electrode potentials
Platinum electrode	Unreactive electrode used in half cells when neither species is a solid metal
Electrochemical cell	A cell produced when 2 half cells of different electrode potentials are linked by a salt bridge
Salt bridge	A medium connecting two half cells. Contains inert ions to allow charge to flow without interfering with the electrochemistry
EMF	Electro motive force. The potential difference of a cell when no current flows
Feasible reaction	A spontaneous redox reaction which generates a positive E° for the cell
Anode	The electrode where oxidation happens. In an electrochemical cell this is the negative terminal
Cathode	The electrode where reduction happens. In an electrochemical cell this is the positive terminal. Often on the right
Non-rechargeable cell	A cell with a spontaneous reaction which cannot be reverse
Rechargeable cell	A cell with a spontaneous reaction which can be reversed by applying an electric current
Fuel cell	A cell which generates an EMF providing a continuous flow of chemicals are provided
Hydrogen fuel cell	A fuel cell which uses hydrogen and oxygen to generate an EMF. Water is the only waste product

2. Standard hydrogen electrode

Half cell equation:

$$2\,H^+_{(aq)} + 2\,e^- \rightleftharpoons H_{2(g)}$$

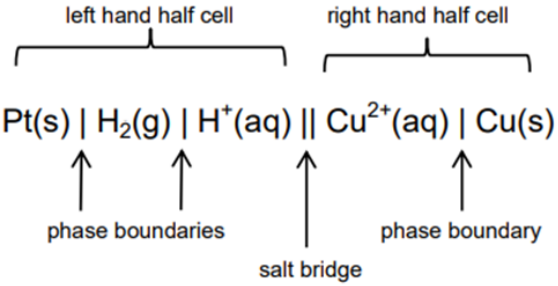
$$E^\circ = +0.00\ V$$



Cell notation:

$$Pt(s) \mid H_2(g) \mid H^+(aq)$$

3. How to write conventional cell notation



Highest oxidation state is nearest the salt bridge

If platinum electrode is present it goes on the far edges

4. Calculating the EMF of a cell

$$EMF = E_{cell} = E_{right} - E_{left}$$

Note: SHE always goes on the left