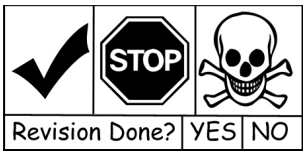
Unit 16 Electrochemistry (Paper 1 & 3)

16.1 Electrode potentials and electrochemical cells

Electrode potentials and cells

IUPAC convention for writing half-equations for electrode reactions.
The conventional representation of cells.
Cells are used to measure electrode potentials by reference to the standard hydrogen electrode.
The importance of the conditions when measuring the electrode potential, E.
Standard electrode potential, E Θ , refers to conditions of
298 K, 100 kPa and 1.00 mol dm^{-3} solution of ions.
Standard electrode potentials can be listed as an electrochemical series.

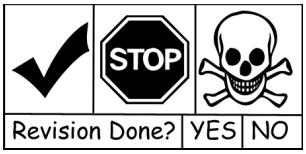


You should be able to:

- use E Θ values to predict the direction of simple redox reactions
- calculate the EMF of a cell
- write and apply the conventional representation of a cell.

Commercial applications of electrochemical cells

Electrochemical cells can be used as a commercial source of electrical energy.
The simplified electrode reactions in a lithium cell:
Positive electrode: $Li^+ + CoO_2 + e- \rightarrow Li + [CoO_2]^-$
Negative electrode: $Li \rightarrow Li^+ + e-$
Cells can be non-rechargeable (irreversible), rechargeable or fuel cells.
Fuel cells are used to generate an electric current and do not need to be electrically recharged.
The electrode reactions in an alkaline hydrogen–oxygen fuel cell.
The benefits and risks to society associated with using these cells.



You should be able to:

- use given electrode data to deduce the reactions occurring in non-rechargeable and rechargeable cells
- deduce the EMF of a cell
- explain how the electrode reactions can be used to generate an electric current.
