

REDOX (v.4)

VOLTAIC CELL

- Element **higher** in reactivity series gets **oxidized** at the **anode** (loses e^- -> **negative**)
- Element **lower** in reactivity series gets **reduced** at the **cathode** (gains e^- -> **positive**)

To find E:

1. Find which element gets oxidized/reduced
2. Write half equations (invert accordingly, sign too)
3. Add E of the two electrodes

- If $E > 0$, the reaction is **spontaneous**

To find redox equation:

1. Write half equations
2. Balance them so that they both have same number of electrons
3. Add half equations

- E is **independent** of stoichiometric coefficients of half equations

ELECTROLYSIS

Molten salt:

- Cation (+) moves to cathode (-) and gets reduced (gains electrons)
- Anion (-) moves to anode (+) and gets oxidized (loses electrons)

In aqueous solution (inert electrodes, C or Pt):

- If **cation lower than $H_2O \rightarrow H_2$ ($E = -0.83V$)**, **it will get reduced** at the cathode, **otherwise** H_2O will get reduced producing H_2
- If **anion higher than $H_2O \rightarrow O_2$ ($E = +1.23V$)**, **it will get oxidized** at the anode, **otherwise** H_2O will get oxidized producing O_2
 - If ion at high concentration, **it** will get oxidized/reduced instead of water
 - If metal electrode, **it** will also get oxidized at anode
- More e^- in half equation => smaller amount produced for same current
- More current/longer time => more amount produced

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