**E°cell and Gibbs free energy**

ΔG° = -nFE°cell

Where F = Faraday’s constant = charge in coulombs of 1 mol of electrons (96500 C mol-1)

Given: the following reduction half-reaction

 Half Rxn (red): (1) Fe3+ (aq) + e- 🡪 Fe2+ (aq) E°red = 0.77 V

Half Rxn (red): (2) S2O6 -2 (aq) + 4H+ (aq) + 2e- 🡪 2 H2SO3 (aq) E°red = 0.60 V

i) Calculate E°, ΔG° and Keq for the reaction at 298 K

**Electrolytic Cells**

**Types of electrolytic cells:**

1. Molten electrolyte (SL)
2. Aqueous electrolyte (concentrated) with inert electrodes
3. Aqueous electrolyte (dilute) with inert electrodes
4. Aqueous electrolyte with active electrodes
5. Electrolysis of water

**2. Electrolysis of concentrated aqueous solution** – we must consider the possible oxidation/reduction of water.

Example – consider the electrolysis of aqueous sodium chloride

What can be reduced?

What can be oxidized?

What will actually happen? The pair of half reactions **requiring the least energy will be preferred**, EXCEPT when the overvoltage effect comes into play. The overvoltage effect accounts for the kinetic limitations of reactions occurring at the electrodes. It is experimentally found that some reactions take more energy than would be predicted by using the table of half reaction potentials, and this is especially noticeable when working with aqueous solutions.