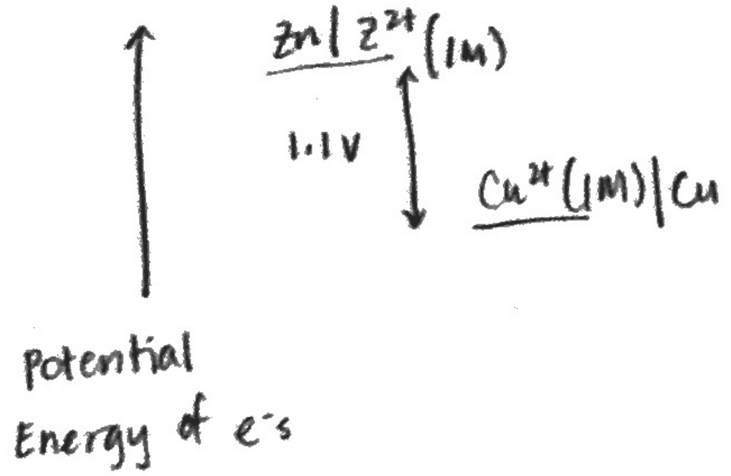
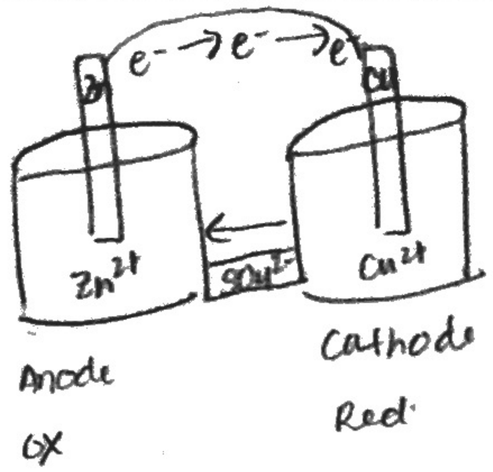
CH302
04/17/14

ELECTROChemistry





Potential Energy

$E = mgh$

Energy of electrons = 0 → $2H^+ \rightarrow H_2 + 2e^-$ "SHE"

$E^\circ = 0V$

↑ oxidizing agent

Standard Conditions

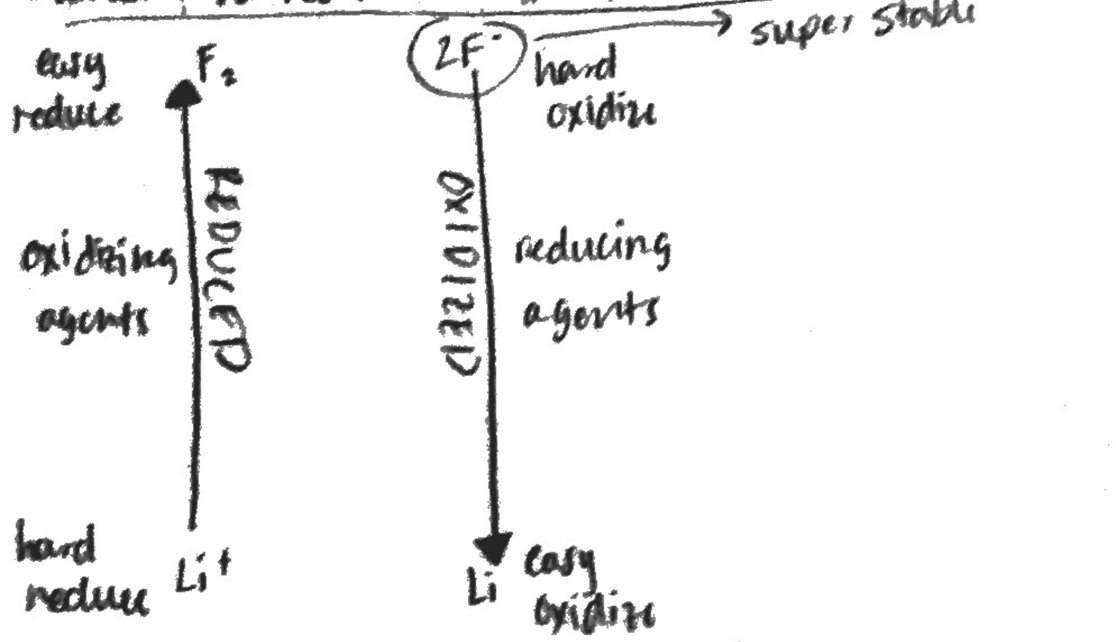
1M

P = 1 atm

* if $Zn \rightarrow Zn^{2+} + 2e^-$ $E^\circ = 0.76V$,

then $Zn^{2+} + 2e^- \rightarrow Zn$ $E^\circ = -0.76V$

Standard ½ reactions written in Reduction ½ reactions



ex: write cell reaction for cell diagram:

$Pt(s) \mid H_2(g) \mid H^+(aq) \mid\mid Co^{3+}(aq), Co^{2+}(aq) \mid Pt(s)$

$H_2 + 2Co^{3+} \rightarrow 2H^+ + 2Co^{2+}$ balanced equation MATTERS!

NOMENCLATURE

$E > 0$ • Galvanic (Voltaic): reaction is spontaneous. Can make battery

$E < 0$ • Electrolytic: Reaction is not spontaneous, have to input work to get reaction to proceed.

To calculate standard potential of an electrochemical cell... use tabulated reduction potentials for each half reaction.

* # of e-s does NOT matter *

$E^\circ(cell) = E^\circ(cathode) - E^\circ(anode)$

$E^\circ > 0 \rightarrow$ SPONTANEOUS $\rightarrow \Delta G < 0$

$E^\circ < 0 \rightarrow$ NONSPONTANEOUS $\rightarrow \Delta G > 0$