

red happens @
↓

oxid happens @
↓

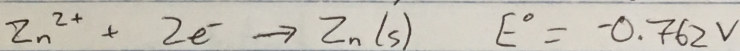
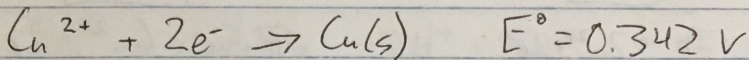
$$E^\circ_{\text{cell}} = E^\circ_{\text{red}}(\text{cathode}) - E^\circ_{\text{red}}(\text{anode})$$

$$E^\circ_{\text{cathode}} [\text{Cu}^{2+} \rightarrow \text{Cu}(s)] = 0.342 \text{ V}$$

$$E^\circ_{\text{anode}} [\text{Zn}^{2+} \rightarrow \text{Zn}(s)] = -0.762 \text{ V}$$

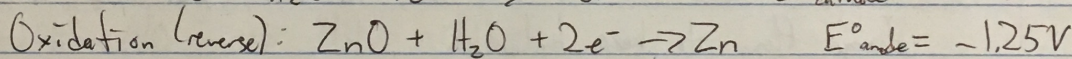
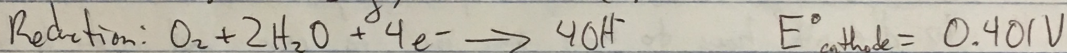
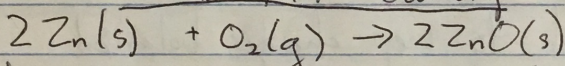
Fri Apr 19 Try it!
 e^- flow from anode $\rightarrow$ cathode where reduction occurs
and from $\uparrow$ potential $\rightarrow$ $\downarrow$ potential

cathode
(reduction) $\downarrow$
anode
(oxidation) $\uparrow$



$$E^\circ_{\text{cathode}} - E^\circ_{\text{anode}} \\ 0.342 \text{ V} - (-0.762 \text{ V}) = 1.104 \text{ V}$$

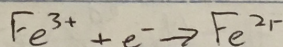
Zinc-Air battery



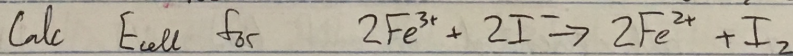
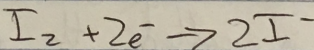
$$E^\circ_{\text{cell}} = (0.401 \text{ V}) - (-1.25 \text{ V}) = 1.65 \text{ V}$$

larger E° undergoes reduction

$$E^\circ_{\text{red}} = 0.771 \text{ V}$$



$$E^\circ_{\text{red}} = 0.535 \text{ V}$$



$$E_{\text{cell}} = 0.771 \text{ V} - (0.535 \text{ V})$$

$$= 0.236 \text{ V}$$

$Lg + E^\circ_{\text{red}} \rightarrow$ easily reduced $\Rightarrow$ strong oxidizing agents

$Lg - E^\circ_{\text{red}} \rightarrow$ difficult to reduce, easy to oxidize $\Rightarrow$ strong reducing agents

Redox, free energy, and K

• all these tell us about spontaneity

$$\Delta G^\circ = -nFE^\circ = -RT \ln K$$

$F = 96,485 \text{ C/mol}$
Faraday constant