

Finishing Ch 20

$$E_{\text{cell}}^{\circ} = E_{\text{cathode}}^{\circ} - E_{\text{anode}}^{\circ} = 0$$

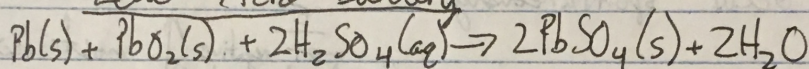
$$E = E^{\circ} - \frac{0.0592 \text{ V}}{n} \log Q \quad Q = \frac{[\text{Zn}^{2+}]_{\text{dil}}}{[\text{Zn}^{2+}]_{\text{conc}}}$$

$$= 0 = -\frac{0.0592 \text{ V}}{2} \log \frac{1.5 \times 10^{-2}}{1.6}$$

$$= 6.0 \times 10^{-2} \text{ V}$$

Examples of Batteries

- Lead-acid battery → cars
- Alkaline battery → flashlights
- both need cathode, anode, electrolyte (salt bridge) + connector

Lead-Acid Battery

$$E^{\circ}_{\text{cathode}} = 1.685 \text{ V}$$

$$E^{\circ}_{\text{anode}} = -0.356 \text{ V}$$

$$E^{\circ}_{\text{cell}} = 2.041 \text{ V}$$

- 12V battery has six cells in series

Fuel Cells

- The cells use hydrogen gas as fuel and oxygen from air
- They react together to form water
- Fuel cells are NOT batteries; the source of energy must be continuously provided
- Expected to be 2x as efficient as combustion

Corrosion components

- In order for corrosion to occur, there must be a complete redox couple

