

Mon Apr 15

Ch 20 Electrochemistry

Redox in Nature

- Photosynthesis and respiration
- Combustion
- Weathering
- Anoxia in lakes

Using Redox Rxns

• Batteries

↳ electrons being transferred, current used to power device

• Fuel Cells

↳ supply fuel (hydrogen and oxygen), battery never dies

Electrochemistry

• Electrochemistry is the study of:

- generating an electric current from a spontaneous redox rxn
- using an electric current to drive a non-spont. redox rxn

Oxidation and Reduction

- a species is oxidized when it loses electrons
 - Zinc loses two e^- , forming Zn^{2+} ion
- a species is reduced when it gains e^-
 - H^+ gains an e^- , forming H_2
- an oxidizing agent causes something to be oxidized (H^+); a reducing agent causes something to be reduced (Zn)

Rules for determining oxidation states (reminder from fall)

1. an atom in elemental form is 0
2. monoatomic (free) ion = its charge
3. Sum of oxid. #s of atoms in any uncharged compound is 0.
Sum of oxid. #s of atoms in a charged species (ex. polyatomic ion) is = charge of species
4. Within compounds, the following apply (in order):
 - a) Alkali metals have oxidation number +1 (e.g. NaCl)
 - b) Alkaline earth metals have oxid # +2 (e.g. $BaCl_2$)