IPC – Chapter 17 Section 1 Notes

Properties of Metals

* shiny (lusterous), malleable, ductile, & good conductors of heat and electricity
* solids at room temperature except for mercury (it’s a liquid)
* most of the elements on the periodic table are metals

Bonding in metals

* metals generally have 1 to 3 electrons in their valence shell
* metals typically give these electrons away to the atoms of nonmetals
  + when metals lose their valence electrons, they become positive ions called cations
* form ionic bond with nonmetals
* metallic bonding happens when positively charged metallic ions is surrounded by a sea of electrons
  + metallic bonding explains many properties of metals (ex. malleability, ductility, good conductors of heat & electricity)

Alkali metals (group 1)

* have one valence electron
* most reactive group
  + rapid and violent reactions with water and oxygen
* softer than most metals

Alkaline Earth metals (group 2)

* have two valence electrons
* highly reactive but not as much as alkali metals

Transition Elements

* less reactive & often found as uncombined elements in nature
* Iron Triad
  + iron, cobalt, and nickel
  + most common magnetic elements
* Coinage Metals
  + copper, silver, and gold
  + stable, malleable, found freely in nature
* Zinc, Cadmium, Mercury
  + zinc and cadmium both form protective coatings
  + mercury is a liquid at room temperature
    - toxic and can accumulate in the body

Inner Transition Elements

* Lanthanides – 1st row in the bottom section of the periodic table
* Actinides – 2nd row in the bottom section of the periodic table
  + all actinides are radioactive and unstable
  + rare or nonexistent in nature

Earth’s Crust

* Most metals in the crust are minerals.
* Minerals are often found in ores that must be mined