

Bonding

Fri., 2/7/20

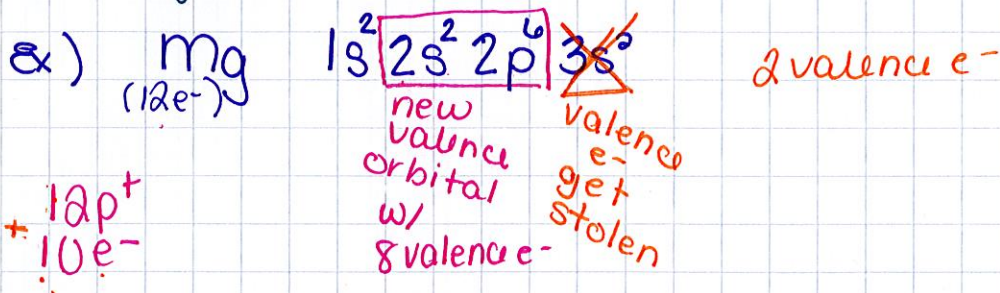
when 2 or more atoms connect and get "stuck" together to create compounds

Ionic Bonding - form between a metal & a nonmetal

Octet Rule

• All elements want to have 8 valence e^- (full s & p sublevels) - creates stability (except H & He, which only need 2 valence e^-)

• Metals - have low ionization energy & easily give up their valence e^- to nonmetals

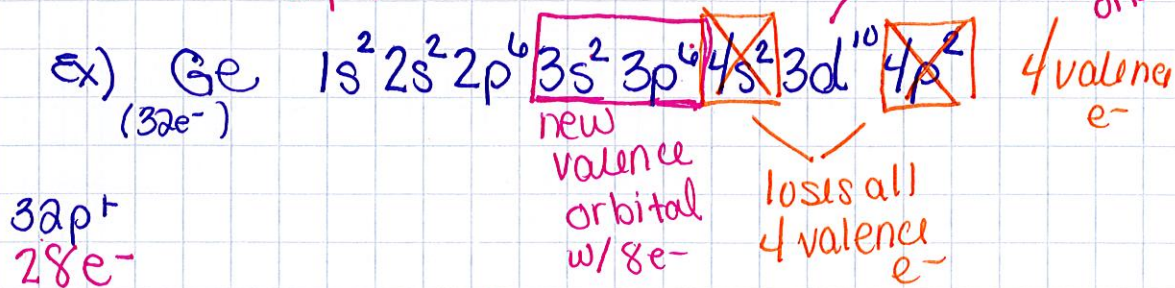


becomes positively charged ion,



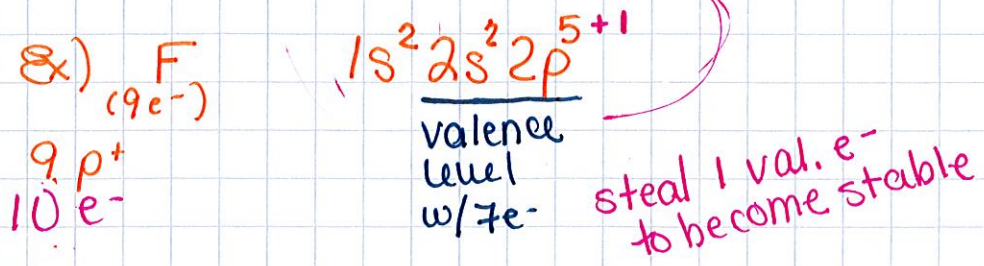
cations

not in valence orbital

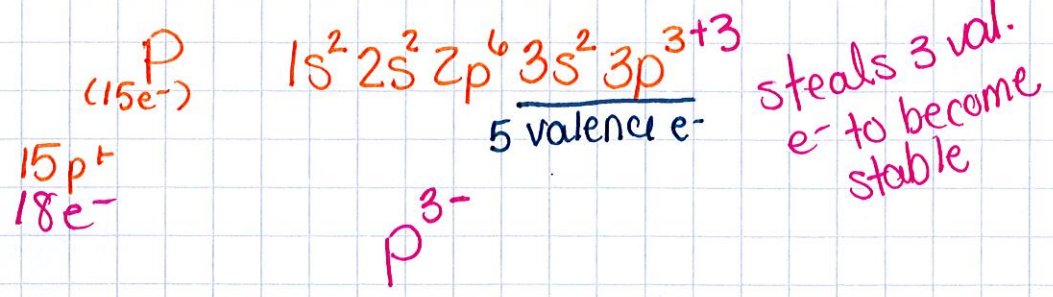
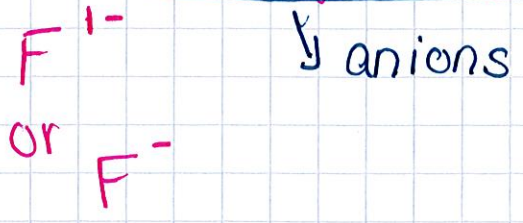


- Nonmetals - have really high ionization energy (can't easily steal its valence e^-) & have high electronegativities (desire for another atom's e^-)

- steal valence e^- from metals to become stable



becomes a negatively charged ion



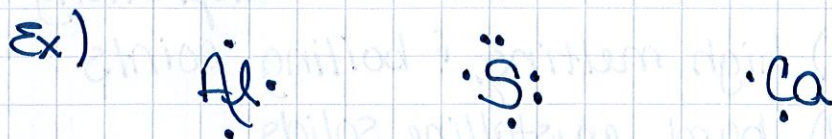
Summary

- Metals lose valence e^- to become stable (have valence e^-), they form + charged cations
- Nonmetals steal valence e^- to become stable (have 8 valence e^-), they form - charged anions

The attraction b/w a cation (+) & an anion (-) forms the ionic bond.

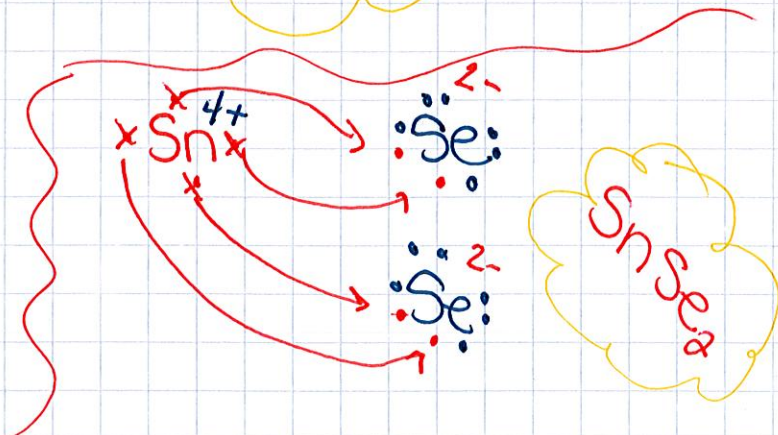
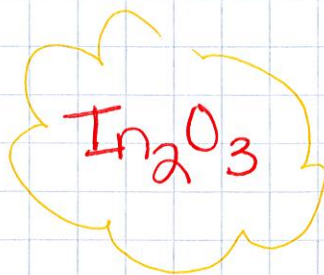
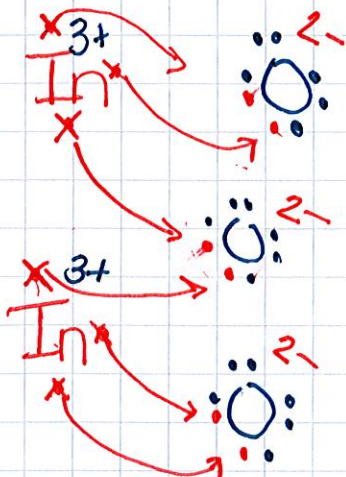
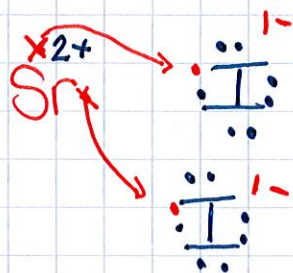
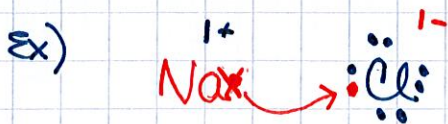
Showing formation of an ionic bond - using e⁻ dot diagrams

use symbol for the element
& up to 8 dots for its valence
e⁻'s.



Steps

- 1) Draw e⁻ dot diagrams for the metal & the nonmetal
- 2) Draw arrows to show e⁻'s transferring from metal to nonmetal
- 3) write charges that form
- 4) write formula for the new compound



Properties of Ionic Compounds

occur b/c ionic bonds
are extremely strong

- 1) high melting & boiling points
- 2) hard, crystalline solids
- 3) conduct electricity when molten or dissolved in solution.