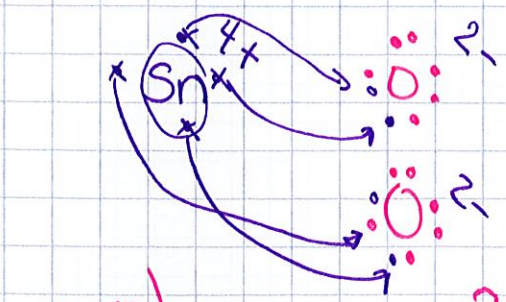
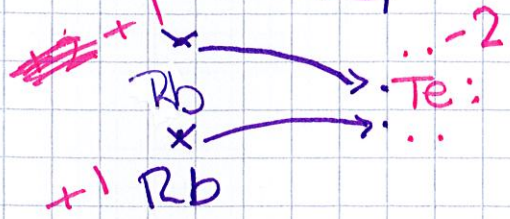
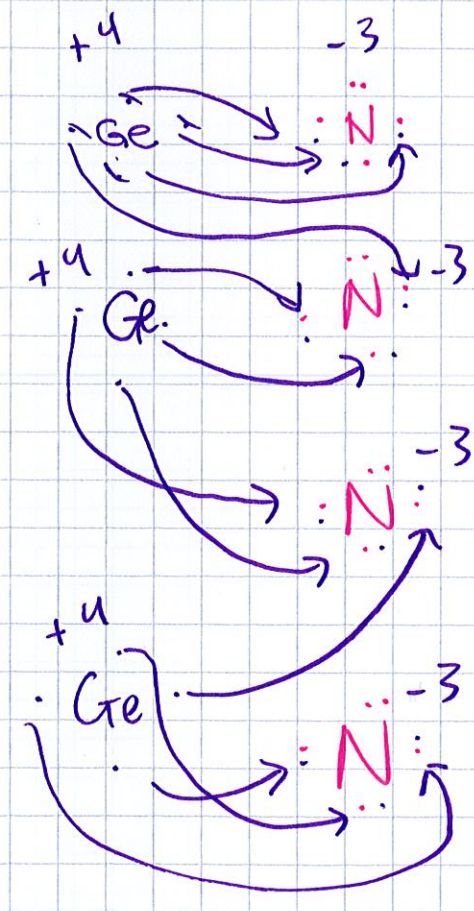
e- dot diagram examples



SnO_2



Rb_2Te



Ge_3N_4

Properties of Ionic Compounds

Why?

(1) hard & brittle solids - very strong bond holds ions extremely close together so they can't move much.

(2) conduct electricity as a liquid (but not as a solid)
- in the liquid, ions (charged atoms) are free to move around. Electricity is a flow of e^-. ∴ they conduct when ions can move.

(3) high melting & boiling points
- ionic bonds are so strong, it takes a lot of energy (heat) to break the bond so the ions can flow/move.

(ex) table salt - NaCl (ionic) - melts at 800°C (1472°F)
sugar - $C_{12}H_{22}O_{11}$ (not ionic) - melts at 186°C (366.8°F)

(4) high heat of fusion & heat of vaporization

↓ energy needed to convert a solid to a liquid @ its melting pt.

↓ energy needed to convert a liquid to a gas @ its boiling pt.

- strong bonds require lots of energy to break in order to change its state of matter

Covalent Bonding

- a strong force of attraction (almost as strong as an ionic bond) that occurs when 2 nonmetals share valence e⁻.

- why do they share e⁻ instead of 1 atom taking e⁻ from the other?
  - In ionic compounds, the nonmetal has a high electronegativity & the metal has a low electronegativity (attraction for e⁻). The nonmetal has enough "desire" for the e⁻ so it takes it.
  - In covalent compounds, both nonmetals have high electronegativities. Neither atom is capable of stealing e⁻ from the other atom so they are forced to share.

Lewis Structures - show the sharing of e⁻

STEPS

(1) Find the total # val. e⁻ in the molecule
(2) Find the # pairs of e⁻ by dividing the total by 2.
(3) Determine the center & end atoms. The center is the element w/ the lowest electronegativity. (closest to the left side of the PT). H is never a center. Draw it.
(4) Draw a line b/w the center & each end atom. These are BONDING PAIRS OF e⁻.
(5) Determine the # LONE PAIRS OF e⁻: subtract the # BONDING PAIRS from # pairs of e⁻. PLACE lone pairs around structure, start w/ end atoms, to satisfy the octet rule.
(6) Run out of lone pairs & the center atom isn't stable? Remove lone pair(s) from end atoms & make double or triple bonds

EXAMPLE

CF_4