

Review - Electron Configuration and Bonding

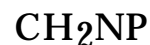
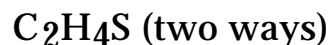
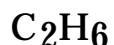
- Principal energy level vs. sublevels (orbitals)
- Electron configurations for any element (except those requiring f orbitals)
- Structure of the Periodic table and how it relates to orbital filling
- Valence electrons
 - What is most stable
 - Their significance in bonding (forming charges or covalent bonds)
 - Relationship between the following periodic properties:
 - Electronegativity, ion formation, ionization energy, atomic size
- Strong (covalent and ionic) vs. weak bonds (van der Waals)
- Covalent vs. ionic bond and the relationship to electronegativity
- Polar covalent vs. non-polar covalent bonds.
- Structure of ionic and molecular substances
- Predict simple ionic formulas.
- Lewis dot diagrams and bond diagrams (structural formulas)
- Be able to make some predictions about molecular shapes based on single vs. double bonds and the lone pairs of electrons.
- Be able to predict some properties of substances based upon their underlying atomic structure and types of bonds.

Example Questions and Problems:

- 1) Give the long and shortcut electron configurations for the following elements: S, Ag, and I.
- 2) What are valence electrons? Underline them in the electron configurations from question one.
- 3) List at least three things that are true about elements which are in the same column of the periodic table.
- 4) Explain the terms electronegativity, ionization energy, and atomic radius.
- 5) Explain why it is harder to remove an electron from chlorine than it is for sodium? (Talk about ionization energy, atomic radius, and the most stable number of valence electrons.)
- 6) What kind of compound will form if sodium and chlorine react with each other: ionic or covalent? Why?
- 7) How is the structure of ionic compounds different from molecular compounds. (In other words, if you had to draw an atomic level picture of an ionic compound - NaCl, how would it differ from the atomic level picture of a molecular compound like CH₄?)
- 8 Explain why oxygen will form two covalent bonds when sharing electrons or a negative two charge when forming an ion?

(over)

- 9) Give an example of an element that will form a covalent bond with oxygen and an element that will form an ionic bond with oxygen. Explain why these elements bond to oxygen in this way.
- 10) Why do elements that are in the same column have similar chemical properties?
- 11) For each of the following formulas do the following:
- a) lewis dot diagram
 - b) structural formula
 - c) 3D sketch of the molecule's shape



- 12) What are van der Waals bonds? Explain how they form.
- 13) Give one example of how van der Waals bonds affect the properties of a substance.