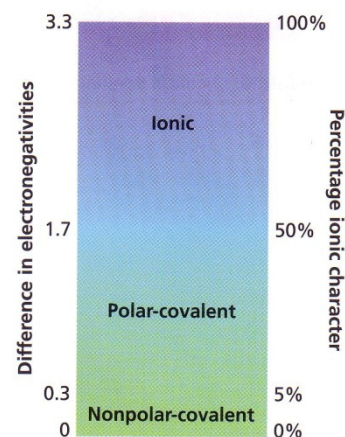


Section 1: Types of Bonds: In this section you will examine and classify the following compounds as ionic, polar-covalent, or non-polar-covalent. Remember that you can determine the type of bond by finding the *difference in electronegativity*.

1											13	14	15	16	17		
H 2.1											B 2.0	C 2.5	N 3.0	O 3.5	F 4.0		
2	Li 1.0	Be 1.5											Al 1.5	Si 1.8	P 2.1	S 2.5	Cl 3.0
3	Na 0.9	Mg 1.2	3	4	5	6	7	8	9	10	11	12	Ga 1.6	Ge 1.8	As 2.0	Se 2.4	Br 2.8
4	K 0.8	Ca 1.0	Sc 1.3	Ti 1.5	V 1.6	Cr 1.6	Mn 1.5	Fe 1.8	Co 1.8	Ni 1.8	Cu 1.9	Zn 1.6	In 1.7	Sn 1.8	Sb 1.9	Te 2.1	I 2.5
5	Rb 0.8	Sr 1.0	Y 1.2	Zr 1.4	Nb 1.6	Mo 1.8	Tc 1.9	Ru 2.2	Rh 2.2	Pd 2.2	Ag 1.9	Cd 1.7	Tl 1.8	Pb 1.8	Bi 1.9	Po 2.0	At 2.2
6	Cs 0.8	Ba 0.9	La* 1.1	Hf 1.3	Ta 1.5	W 2.4	Re 1.9	Os 2.2	Ir 2.2	Pt 2.2	Au 2.4	Hg 1.9	Pb 1.8	Bi 1.9	Po 2.0	At 2.2	
7	Fr 0.7	Ra 0.9	Ac† 1.1	* Lanthanides: 1.1–1.3 † Actinides: 1.3–1.5													



- Define electronegativity:
- What is the difference in an ionic and covalent bond?
- What is the difference in a polar-covalent and non-polar-covalent bond?
- What type of bond forms between potassium and chloride? (*Prove your answer with math and compare it to the chart.*)
Choose one: (ionic) (polar-covalent) (non-polar-covalent)
- What type of bond forms between rubidium and oxygen? (*Prove your answer with math and compare it to the chart.*)
Choose one: (ionic) (polar-covalent) (non-polar-covalent)
- What type of bond forms between carbon and oxygen? (*Prove your answer with math and compare it to the chart.*)
Choose one: (ionic) (polar-covalent) (non-polar-covalent)
- What type of bond forms two oxygen atoms in a diatomic molecule? (*Prove your answer with math and compare it to the chart.*)
Choose one: (ionic) (polar-covalent) (non-polar-covalent)
- What type of bond is calcium fluoride (CaF₂)? (*Prove your answer with math and compare it to the chart.*)
Choose one: (ionic) (polar-covalent) (non-polar-covalent)
- What type of bond is nitrogen monoxide (NO)? (*Prove your answer with math and compare it to the chart.*)
Choose one: (ionic) (polar-covalent) (non-polar-covalent)

Section 2: Electron Dot Diagrams.

Before you continue, label each box on the blank periodic table with the number of valence electrons. Remember that the number of valence electrons is a group property (*with the exception of Helium who doesn't follow the trend.*) Once you have filled in the PT with the number of valence electrons, draw the electron dot diagrams of the following elements.

10. Hydrogen

11. Potassium

12. Calcium

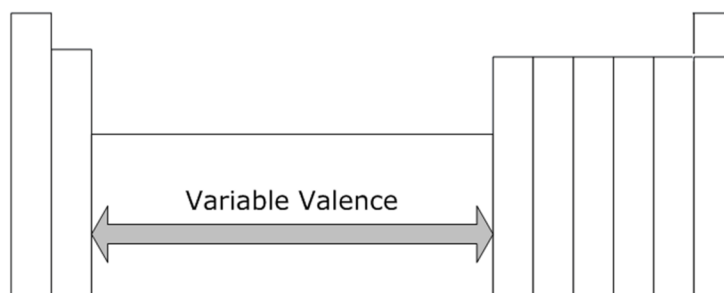
13. Beryllium

14. Aluminum

16. Silicone

17. Phosphorus

18. Sulfur



15. Gallium

19. Iodine

22. Helium

20. Bromine

21. Argon

Section 3: Draw the Lewis Structures for the following compounds. Review the 5 steps for drawing Lewis structures below and follow each step showing your work along the way.

Example: SiF_4

Step 1: $\text{Si} = 1$
 $\text{F} = 4$

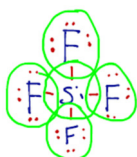
Step 2: $\text{Si} = 4\text{VE} = \cdot\text{Si}\cdot$
 $\text{F} = 7\text{VE} = \cdot\ddot{\text{F}}\cdot$

Step 3: Total VE = $4 + 7 + 7 = 25\text{VE}$

Step 4: $\begin{array}{c} \text{F} \\ | \\ \text{F}-\text{Si}-\text{F} \\ | \\ \text{F} \end{array}$

Step 5: $\begin{array}{c} \cdot\ddot{\text{F}}\cdot \\ | \\ \cdot\ddot{\text{F}}-\text{Si}-\ddot{\text{F}}\cdot \\ | \\ \cdot\ddot{\text{F}}\cdot \end{array}$

Step 6: Verify Octet



Steps for Drawing Lewis Structures:

1. Determine the type and number of atoms in the molecule.
2. Write the electron-dot notation for each type of atom in the molecule.
3. Determine the total number of valence electrons in the atoms to be combined.
4. Arrange the atoms to form a skeleton structure for this molecule. (*If carbon is present, it is likely the central atom. Otherwise, the least electronegative atom is central (except for hydrogen, which is never central).*) Then connect the atoms by electron-pair bonds.
5. Add unshared pairs of electrons so each atom shares a pair of electrons and each nonmetal is surrounded by eight electrons. (*This is to fill the octet. Remember that Hydrogen is full with 2 electrons so never give any unshared pairs to a hydrogen atom.*)
6. Count the electrons in the structure to be sure the number of valence electrons used equals the number available (from step 3). Be sure the central atom and other atoms besides hydrogen have an octet.

23. NH_3

24. CH_2Cl_2

25. H_2O

26. NF_3

27. H_2O_2

28. H_2S

29. COCl_2

30. I₂

31. PCl₃

32. C₂H₄

33. CCl₄

34. HCN

35. SiO₂

36. CH₄O

For 23-36 go back and label the molecular geometry for each molecule.

23. _____

24. _____

25. _____

26. _____

27. _____

28. _____

29. _____

30. _____

31. _____

32. _____

33. _____

34. _____

35. _____

36. _____