

Basics of Bonding & Lewis Dot Structures

Part I. Summarizing Bond Types- Read the article "The Different Types of Bonds" and complete the table below using the following information:

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|---|--|---|---|
| <ul style="list-style-type: none"> • Forms between a Metal & Non-metal | <ul style="list-style-type: none"> • Outer electrons shells overlap creating "sea of electrons" | <ul style="list-style-type: none"> • Ex: glucose ($C_6H_{12}O_6$), fats, DNA, & proteins (forms large structures) | <ul style="list-style-type: none"> • Forms crystal lattice structure |
| <ul style="list-style-type: none"> • Forms between Non-metal & Non-metal | <ul style="list-style-type: none"> • Electrons are shared between atoms | <ul style="list-style-type: none"> • Creates cations and anions | <ul style="list-style-type: none"> • Ex: NaCl and other salts |
| <ul style="list-style-type: none"> • Forms between Metal & Metal | <ul style="list-style-type: none"> • Electrons transferred or lost between atoms | <ul style="list-style-type: none"> • Can create single, double, or triple bonds | <ul style="list-style-type: none"> • Easily conducts electricity, can be shaped & pulled into wire |
| <ul style="list-style-type: none"> • Ex: Brass (which is an alloy made from copper and zinc) | <ul style="list-style-type: none"> • Are referred to as "molecules" | | |

Comparing the 3 Bond Types

	Ionic	Covalent	Metallic
Types of elements it forms between:	•	•	•
How it works:	•	•	•
Examples:	•	•	•
Other information:	• •	• •	•

Part II. Identifying Bond Type

Identify the following compounds as either **Ionic** or **covalent** based on their formula & **why**

1. FeS Ex: <i>Ionic</i> why? <i>Metal + non-metal</i>	6. CO ₂
2. CO	7. SO ₃
3. H ₂ O	8. AlBr ₃
4. Na ₂ O	9. K ₂ SO ₄
5. NaCl	10. Al(NO ₃) ₂

Part III. Lewis Dot Structure Practice/ Bonding

Electronegativities: Sodium = 0.9, Chlorine = 3.0, Lithium = 1.0, Oxygen = 3.5, Potassium = 0.8, Bromine = 2.8, Sulfur = 2.5, Iodine = 2.5, Hydrogen = 2.1

(1.7 or greater difference in electronegativity= ionic bond)

a) Draw Lewis Dot Structures b) Draw <u>how</u> they bond & indicate charge if needed (ionic & covalent bonds look different)	a) Write the electronegativity for each element b) Subtract the 2 numbers to find the difference	a) Forms an <u>Ionic</u> or <u>Covalent</u> bond ? b) How do you know?
1. <div style="display: flex; justify-content: space-around; align-items: center; height: 100px;"> Na Cl </div>	Na= 0.9 (weak) Cl= 3.0 (strong) Difference= <u>2.1</u>	
2. <div style="display: flex; justify-content: space-around; align-items: center; height: 100px;"> I I </div>	I= I=	
3. <div style="display: flex; justify-content: space-around; align-items: center; height: 100px;"> K Br </div>	K= Br=	
4. <div style="display: flex; justify-content: space-around; align-items: center; height: 100px;"> S O </div>	S= O=	
5. <div style="display: flex; justify-content: space-around; align-items: center; height: 100px;"> Li O Li </div>	Li= O=	
6. <div style="display: flex; justify-content: space-around; align-items: center; height: 100px;"> H O H </div>	O= H=	
7. <div style="display: flex; justify-content: space-around; align-items: center; height: 100px;"> N N </div>		

8. What's wrong with this following Lewis dot structures?



9. Why do atoms form bonds?

10. How can one use the periodic table to determine the type of bond atoms will form?

11. a. What is electronegativity?

b. Why is electronegativity important to know when determining bond type?

c. Rank the following from the least electronegative to the most electronegative:
P, Na, Ar, O, C, N, F