

18.1: Electron-Dot Structures Help Us to Understand Bonding

What are the **3 types of bonds** we will be learning about? _____

When 2 atoms meet, which part of the atom interacts in bonding?

Recall **electron shells** from Ch. 15: Draw the electron shell for an atom of **Nitrogen**.

What are **valence electrons**?

What is an **Electron-Dot Structure** (aka _____)?

Draw the Electron-Dot Structures for the following elements:

- | | |
|--------------|--------------|
| 1. Hydrogen | 6. Oxygen |
| 2. Beryllium | 7. Fluorine |
| 3. Boron | 8. Neon |
| 4. Carbon | 9. Sodium |
| 5. Nitrogen | 10. Chlorine |

What are **non-bonding pairs** of electrons?

What about **unpaired electrons**?

18.2: Atoms Can Lose or Gain Electrons to Become Ions

Define **Ion**:

There are **2 types of ions**:

- 1.
- 2.

A _____ is formed when a neutral atom _____ 1 or more electrons. Metals lose electrons to form positive ions.

Ex (Draw out):

An _____ is formed when a neutral atom _____ 1 or more electrons. Nonmetals gain electrons to form negative ions.

Ex (Draw out):

The periodic table tells us the type of ion that each atom tends to form. Turn to the periodic table & label the groups.

Questions to Ponder...

- ✓ Why does the sodium atom **tend to lose** its outer electron (sodium has a _____ charge)?
- ✓ Why does the fluorine atom tend **not to lose** any of its outer electrons (fluorine has a _____ charge)?
- ✓ Why do **noble gases not form any ions** (noble gases have a _____ charge)?

18.3: Ionic Bonds Result from a Transfer of Electrons

- Define an **Ionic Compound**:

Ionic compounds are held together by _____. What is an **Ionic Bond**?

Show how sodium chloride (table salt) forms – draw this out.

➤ *Give some examples of Ionic Compounds:*

A chemical compound must have an overall charge of _____. Therefore, if it contains ions (an ionic compound), the charges on the ions must always add up to _____ in the formula.

An **ionic compound** is formed by the combination of a _____ and a _____.

We will use the _____ Method in order to find the chemical formulas of ionic compounds.

Give the chemical formula for each of the following ionic compounds and draw the formation of the compound:

1. sodium fluoride

2. potassium iodide

formula: _____ Draw the formation below:

formula: _____ Draw the formation below:

3. aluminum oxide

4. calcium fluoride

formula: _____ Draw the formation below:

formula: _____ Draw the formation below:

How is sodium chloride arranged in a 3D-model? Draw a sketch!

18.4: Metal Atoms Bond by Losing Their Electrons

- Define a **Metallic Bond**:

Draw a sketch of this.

What is an **Alloy**?

- Give some *examples of alloys*:

18.5: Covalent Bonds Result from a Sharing of Electrons

- Define a **Covalent Compound**:

Covalent compounds are held together by _____. What is a **covalent bond**?

➤ *Give some examples of Covalent Compounds:*

- How does an F_2 molecule form?

- How does an NH_3 molecule form?

What is NH_3 called? _____

- How does a CH_4 molecule form?

What is CH_4 called? _____

✓ *It is possible for 2 atoms to share more than 2 electrons between them.*

When atoms share 4 electrons, this is called a _____. **Draw out an O_2 molecule.**

When atoms share 6 electrons, this is called a _____. **Draw out an N_2 molecule.**

hydrogen 1 H 1.0079	beryllium 4 Be 9.0122	lithium 3 Li 6.941	sodium 11 Na 22.990	magnesium 12 Mg 24.305	potassium 19 K 39.098	calcium 20 Ca 40.078	scandium 21 Sc 44.956	titanium 22 Ti 47.867	vanadium 23 V 50.942	chromium 24 Cr 51.996	manganese 25 Mn 54.938	iron 26 Fe 55.845	cobalt 27 Co 58.933	nickel 28 Ni 58.693	copper 29 Cu 63.546	zinc 30 Zn 65.39	boron 5 B 10.811	carbon 6 C 12.011	nitrogen 7 N 14.007	oxygen 8 O 15.999	fluorine 9 F 18.998	helium 2 He 4.0026			
																	aluminum 13 Al	silicon 14 Si	phosphorus 15 P	sulfur 16 S	chlorine 17 Cl	argon 18 Ar 39.948			
																		gallium 31 Ga	germanium 32 Ge	arsenic 33 As	selenium 34 Se	bromine 35 Br 79.904	krypton 36 Kr 83.80		
																		indium 49 In	tin 50 Sn	antimony 51 Sb	tellurium 52 Te	iodine 53 I	xenon 54 Xe 131.29		
																		cadmium 48 Cd	mercury 80 Hg	thallium 81 Tl	lead 82 Pb	bismuth 83 Bi	polonium 84 Po	astatine 85 At	radon 86 Rn 222
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