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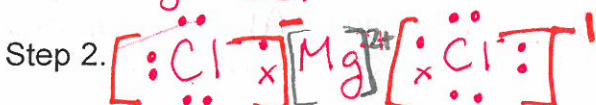
Chemistry 11 LEWIS DOT STRUCTURES

Lewis DOT Structures of **IONIC** compounds are easy to construct:
 HERE ARE THE RULES:

1. Determine the charge expected for each ion
2. Arrange the non-metal ions symmetrically around the metal ion

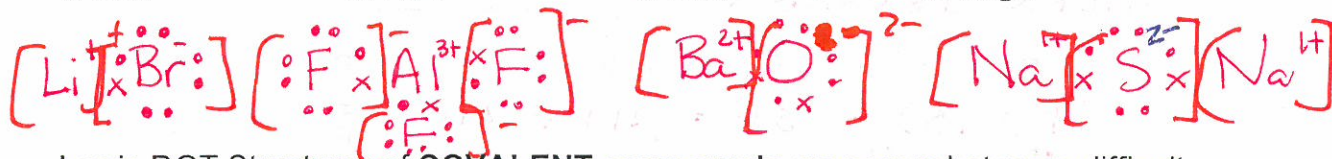
Example 1. Draw the Lewis Structure of $MgCl_2$.

Step 1. $Mg^{2+} 2Cl^{-}$



Example 2. Draw the Lewis Structure for each of the following compounds:

- a. LiBr b. AlF_3 c. BaO d. Na_2S

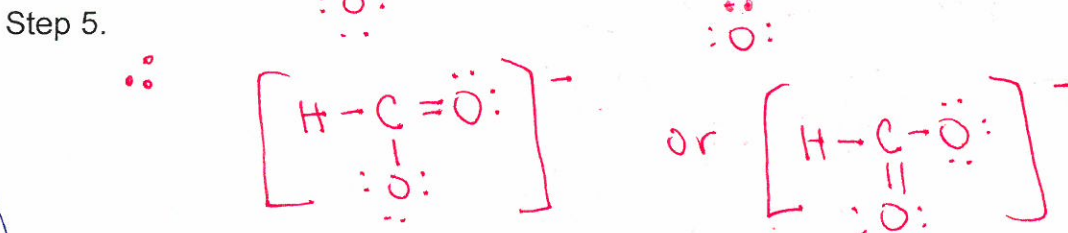
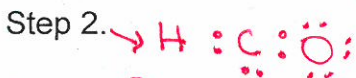


Lewis DOT Structures of **COVALENT** compounds are somewhat more difficult to construct: HERE ARE THE RULES FOR THOSE THAT OBEY THE OCTET RULE

1. Count up the number of valence e's → adjust for an ion → + (subtract) -'ve (add)
2. Place (2) electrons between each atom → "bond"
3. Use remaining electrons to complete OCTETS on "OUTSIDE" atoms.
4. IF CENTRAL ATOM HAS LESS THAN AN OCTET ... HAVE NEIGHBOUR SHARE ELECTRONS → MULTIPLE BONDS
5. TIDY UP & REPLACE ALL PAIRS OF ELECTRONS WITH A DASH

Example 3. Draw the Lewis Structure for CHO_2^{-} : $H \quad C \quad O$

Step 1 $1H = (1) + 2O = (12) + 1C = (4) + 1e^{-} \Rightarrow 18 e^{-}$



Example 4. Draw the Lewis Structure for HOPO : $\text{H} \text{||||} \text{O} \text{||||} \text{P} \text{||||} \text{O}$

Step 1. $1 \text{H} = (1) + 2 \text{O} = (12) + 1 \text{P} = (5) = 18 \text{e}^-$



COVALENT compounds that VIOLATE the OCTET RULE

A. In addition to H, the atoms Be, B and Al are exceptions as they have LESS than a full octet when they form covalent compounds.

\rightarrow These atoms tend to GAIN ONE E FOR EVERY OTHER ATOM PRESENT

Example 5. Draw the Lewis Structure for BF_3 : $\text{F} \text{||||} \text{B} \text{||||} \text{F}$

Step 1. $1 \text{B} = (3) + 3 \text{F} = (21) \Rightarrow 24 \text{e}^-$



Step 4. "B" less than 8 but OK



B. Elements in the 3rd and 4th periods of the periodic table frequently attain MORE than a full octet when they form covalent compounds.

\rightarrow Therefore, the central atom will end up with MORE than eight valence electrons

Example 6. Draw the Lewis Structure for PCl_5 :

Step 1. $1 \text{P} = (5) + 5 \text{Cl} = (35) \Rightarrow 40 \text{e}^-$



Step 4. \rightarrow no need > 8

