**The Formation Of Ionic Compounds – Pre Lab**

**Purpose:** To model the formation of stable ionic compounds by the transfer of electrons, achieving stable electron configurations (noble gas configurations)

**Question:** What other atoms give up and gain electrons (creating ions, forming ionic bonds) to form ionic compounds?

**Background:** A sodium atom (Na) reacts by losing one electron to form a Na+ ion. A chlorine atom (Cl) gains one electron forming a Cl- ion by doing so the to atoms form an ionic bond making the compound NaCl (table salt). The ionic bond is a strong attractive force between oppositely charged ions which forms an ionic compound which has different chemical and physical properties than the original atoms.

**Procedure:**

1. **After you have carefully read all of the above information**; you and your lab partner must locate the following atoms on the periodic table: Li, S, Mg, O, Ca, N, Al and I.
2. Using the information on the periodic table and what you have learned in previous units, complete the following table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Atomic Symbol and Name** | **Metal or Non-metal** | **Number of Valence Electrons** | **Lewis Dot Diagram** | **Electron Configuration** |
| **Li** |  |  |  |  |
| **S** |  |  |  |  |
| **Mg** |  |  |  |  |
| **O** |  |  |  |  |
| **Ca** |  |  |  |  |
| **N** |  |  |  |  |
| **Al** |  |  |  |  |
| **I** |  |  |  | 1s2 2s2 2p6 3s2 3p6 4s2 3d10 4p6 5s2 4d10 5p5 |

1. Based on what you have discovered about the atoms above, construct a hypothesis predicting which of the atoms will give up electron(s) and which will receive electron(s) when forming compounds.
2. REMEMBER a hypothesis is an if… then… statement which answers the lab question

|  |
| --- |
| **Hypothesis:** |

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**Procedure:**

1. Collect one piece of each of the eight different colored sheets
2. Cut each of the sheets into 4 equal size rectangles

|  |  |
| --- | --- |
|  |  |
|  |  |

1. Assign all of the pieces of one color to represent one of the atoms in the pre-lab table. Ex. Red is Mg
2. Label each piece of the colored paper with the appropriate atoms symbol
3. Collect a supply of two different colors of disks, to represent valence electrons of the atoms
4. Select the papers representing the atoms of lithium and sulfur, lay them side by side on a piece of blank white paper
5. Using one color of disks to represent electrons of Li and one color to represent electrons of S construct a Lewis Dot diagram model for each atom
6. Transfer “electrons” from the metallic atoms to the non-metallic atoms so that both elements achieve noble gas electron configuration
   1. Add more atoms if needed
7. Once you have created a stable compound, tape the atoms and electrons in place, then write the ion symbols and charges, as well as the formula and name of the resulting compound on the paper.

10. Repeat steps 7-10 for the remaining combinations of atoms

**Analysis and Conclusions:**

1. Did you have to use more than one atom of an element in some cases? Why?
2. Clearly identify the atoms which gave up an electron, and their class.
3. Clearly identify the atoms which gained an electron, and their class.
4. What similarities can you identify among those atoms who gained an electron and then among those atoms who gave up an electron?
5. Identify a pattern which can be used to predict which atoms will form Ionic compounds. Explain.
6. Identify the noble gasses that have the same electron configuration as each ion produced.

**Prepare your findings for a poster presentation.**