

## Bonding and Chemical Formulas

When the chemical formula for a compound is written correctly, it shows the number of each type of atom in the compound. These numbers, called subscripts, are determined by the bonding between the atoms.

The table shows two columns of elements. The elements in the first column usually give up electrons when they form compounds. The elements in the second column usually gain electrons when they form compounds. The column next to the elements gives the number of electrons found in the outer level of each element. Using this information, determine the charge on the ion after the exchange of electrons. Remember, atoms that give up electrons become positive ions because they lose some of their negative charge. Conversely, atoms that gain electrons become negative ions because they accept more negative charge.

For example, sodium, Na, has one electron in its outer level. It gives up this electron and becomes a +1 ion. Sulfur, S, has 6 electrons in its outer level and gains 2 electrons to fill its outer shell with 8 electrons. Thus, sulfur becomes a -2 ion. These two ions combine to form  $\text{Na}_2\text{S}$ . This formula is correct because it takes 2 sodium ions to match the -2 charge on one sulfur ion. Now show how the positive ion would combine with the negative ion in the same row to form a neutral compound.

Element	Electrons in Outer Level	Charge on Ion	Element	Electrons in Outer Level	Charge on Ion	Formula
Aluminum	3		Chlorine	7		
Magnesium	2		Bromine	7		
Sodium	1		Oxygen	6		
Lithium	1		Oxygen	6		
Calcium	2		Phosphorus	5		
Carbon	4		Chlorine	7		
Aluminum	3		Oxygen	6		
Beryllium	2		Sulfur	6		
Sodium	1		Fluorine	7		
Silicon	4		Neon	8		-----