

Periodic Table For Organic Chemistry

Organic compounds contain only a few of the elements on the Periodic Table. However, the arrangement of these elements can be a powerful tool for understanding how they will behave in organic molecules.

H					
Li					
Na	Mg				
K					
		B	C	N	O
		Al		P	S
					F
					Cl
					Br
					I

Metals and nonmetals: Nonmetal elements are on the right side of the Periodic Table and include H, B, C, H, N, O, P, S, F, Cl, Br, and I. Metal elements are on the left side of the Periodic Table, and include Li, Na, Mg, Al, and K.

Since organic molecules are covalent, they usually contain only nonmetals elements. However, Na and K can act as counterions to charged organic molecules. Li and Mg can also be involved in highly polar organometallic bonds in organic compounds. B and Al are important components of reagents that react with organic compounds; a variety of transition metals do this as well.

Periods: Rows on the Periodic Table are called periods. What period an element is in is important in determining its size, and how many valence electrons it can have.

1st period elements (hydrogen) have only an s orbital and can only have 2 valence electrons; they can only form one bond.

2nd period elements (boron-fluorine) have an s and three p orbitals, and can only have 8 valence electrons. They can form up to four bonds.

3rd period elements (mainly phosphorus and sulfur) have an s, three p orbitals, and five d orbitals. They usually have 8 valence electrons, but they can have an extended octet with up to 10 electrons for phosphorus and 12 electrons for sulfur.

Size: Elements get smaller as you go across the Periodic Table; however, this decrease is fairly small. Elements are significantly larger as you go down a family. This can have a significant effect on their behavior, including their strength as bases or nucleophiles.

Families: Columns on the Periodic Table are called groups or families. What family an element is in helps to determine how it will react chemically. Elements in the same family have similar reactivity.

The elements F, Cl, Br, and I are all in the same family and are called halogens. They have similar chemical reactivity.

Electronegativity: Electronegativity increases across a period and up a family; fluorine is the most electronegative element. The increase across a period is the most significant; differences in size usually dominate in a family.