

- **In the atomic state metals are pictured as though their kernels form positive ions that are surrounded by loosely held valence electrons.**

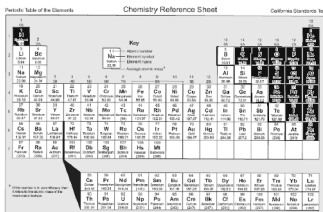
Metallic Properties include the following:

- **Have relatively low ionization energies**
- **Have low electronegativity values**
- **Tend to lose electrons to form positive ions with radii smaller than the atoms.**
- **Are solids at room temperature, with the exception of mercury.**

- **Are malleable and ductile.**
- **Are good conductors of heat and electricity.**
- **Have metallic luster.**

Nonmetals

- Nonmetals are found on the right side of the Periodic Table.
- Nonmetallic properties, most pronounced in those elements appearing in the upper right portion of the table



Properties of Nonmetallic Elements

- Have relatively high ionization energies and high electron affinities.
Ionization energy (I)
 - def. - "energy required to remove an electron from an atom, molecule, or ion"
- Have high electronegativities.
- Tend to gain electrons when they react with metals, and share electrons when they combine chemically with other nonmetals.

More Properties of Nonmetals

- Are usually gases, molecular solids, or network solids at room temperature; bromine, an exception, is a volatile liquid at room temperature
- Are brittle in the solid phase
- Are poor conductors of heat and electricity
 - Lack metallic luster.

Changes across periods

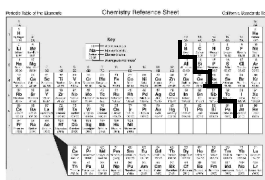
- There is a natural change in the character of the elements as they are considered across any period of the Periodic Table.

- As the number of valence electrons changes from one to eight, the properties of the elements change from metallic to nonmetallic, ending with the stable octet of a noble gas.

Metalloids (Semi-Metals)

- Between the metals and nonmetals are elements that have some properties of both metals and nonmetals. These are called semi-metals, or metalloids.

In many periodic tables, a darkened line divides the metals from the nonmetals.



- The semi-metals are found adjacent to this line.

Periodic Table of the Elements Chemistry Reference Sheet California Standards Test

Key

- 1: Alkali metals
- 2: Alkaline earth metals
- 3: Transition metals
- 4: Halogens
- 5: Noble gases
- 6: Lanthanides
- 7: Actinides

Atomic weights are provided for many elements. The periodic table is organized into groups and periods.

Metal / Semi-Metal / Non-metal

Metals

Nonmetals

Metalloids

[Click a thumbnail image to learn more.](#)
