

Alkaline earth metals make up the second group of the periodic table. This family includes the elements beryllium, magnesium, calcium, strontium, barium, and radium (Be, Mg, Ca, Sr, Ba, and Ra, respectively). Group 2 elements share common characteristics. Each metal is naturally occurring and quite reactive. These metals are silver and soft, much like the alkali metals of Group 1. These metals also react with water, though not as vigorously. Beryllium, interestingly, does not react with water. Each alkaline earth metal has two valence electrons. They will easily give these electrons up to form cations. These metals become increasingly more reactive as you go down the periodic table. This is concurrent with general periodic trends.

## History

Explore the discoverer's biography, including general facts about his life and anecdotes regarding how he made this particular discovery. Also see other significant scientific discoveries built largely on this concept and other real-world applications in history that may not still be relevant.

### Discoverer/Developer

See each tab for individual information about the discoverer of each element.

## Beryllium

Beryllium was discovered in 1797 by Nicholas Louis Vauquelin.

Vauquelin was born on May 16, 1763, in the Normandy village called St. André d'Hébertot. He made rapid progress in the village school and in his religious studies. At the age of fourteen, Vauquelin became a laboratory assistant and dishwasher in an apothecary shop, but he soon left for Paris. In Paris Vauquelin worked in various apothecary shops and studied Latin and botany.

The famous chemist Antoine-François de Fourcroy soon heard of Vauquelin's fondness for chemistry and promptly engaged him as an assistant. Vauquelin was able to continue his study of physics, chemistry and philosophy while assisting Fourcroy in teaching a course at the Athenaeum.

## Magnesium

Magnesium was discovered in 1808 by Sir Humphry Bartholomew Davy.

Davy was born in 1778 in England. He was originally apprenticed as a surgeon, but instead took up chemistry in the pharmacy. Many of his early experiments took place in the home of his grandfather John Tonkin. Davy is best known for his research in the field of electrochemistry and his discovery and isolation of the alkali metals potassium and sodium in 1807. Davy also discovered the physiological action of nitrous oxide (1794), isolated boron in 1808, and later prepared barium, calcium, strontium, and magnesium in the metallic state.

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## Radium

1898 Marie Curie and P. Curie

## Concept Definition

Study the primary definition of this concept, broken into general, basic, and advanced English definitions. Also see the mathematical definition and any requisite background information, such as conditions or previous definitions.

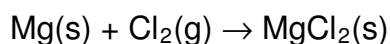
### General Science

Alkaline earth metals are elements located in the second group on the periodic table.

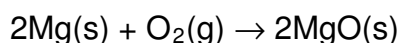
### Advanced

Examples of balanced reactions between alkaline earth metals and various elements.

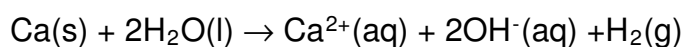
Reaction with halogen:



Reaction with oxygen:



Reaction with water:



## Real World Application

Discover processes or disciplines in the natural or man-made worlds that employ the concept.

### Beryllium

Pure beryllium is very toxic and thus does not have many real world applications. Currently, research is being done to determine if beryllium could be used in rocket fuel. Beryllium is used in nuclear reactors and computer parts. It used to be used in some lighting tubes, but was discontinued due to its hazardous effects on the workers who manufactured the tubes.

### Magnesium

Magnesium is used in popular antacids such as Milk of Magnesia. Due to its low weight, magnesium is used on certain parts of aircraft. Magnesium is also important to the military; it is used in the reaction that heats and prepares MRE (meals ready to eat) for soldiers in the field.

### Calcium

Calcium is very important to the health and strength of bones and teeth. It is also a major contributor to limestone and marble, both of which are used in building and design. Adversely, calcium is one of the main elements responsible for hard water. Elemental calcium is often used in cement-making in construction due to its fortifying nature. Different calcium-containing compounds are found basically everywhere. They are used in toothpastes, insecticides, fertilizers, paints, fireworks, flares, and cosmetics.

### Strontium

Strontium is mainly used in color television tubes. Strontium compounds are used in a variety of different ways. Due to the fact that they burn red, they are often used in firework production. Strontium compounds are capable of desensitizing the teeth and gums and are thus used in some toothpastes that specialize in these conditions.

## Barium

Barium is used in paint pigments. Barium alloys are used in various wires. Barium compounds have many industrial uses such as light bulbs, rat poison, and the formation of glass. Barium is often used for contrast when x-rays of the digestive system are taken.

## Radium

Radium is also used in paints. Radiation therapy for cancer sometimes involves the use of radium. Radium was once used as an additive in various toothpastes, but has been removed to health risks. Historically, radium was used in Rutherford's famous gold foil experiment.

## Vocabulary

Learn important vocabulary for this concept, including words that might appear in assessments (tests, quizzes, homework, etc.) that indicate the use of this concept.

Important Vocabulary	Term	Context
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## Videos

Browse relevant videos from the Journal of Chemical Education's (JCE) Chemistry Comes Alive! library and other video sources.

### Group 2 Reactions with Water

(Test tubes from left to right)

