BY:

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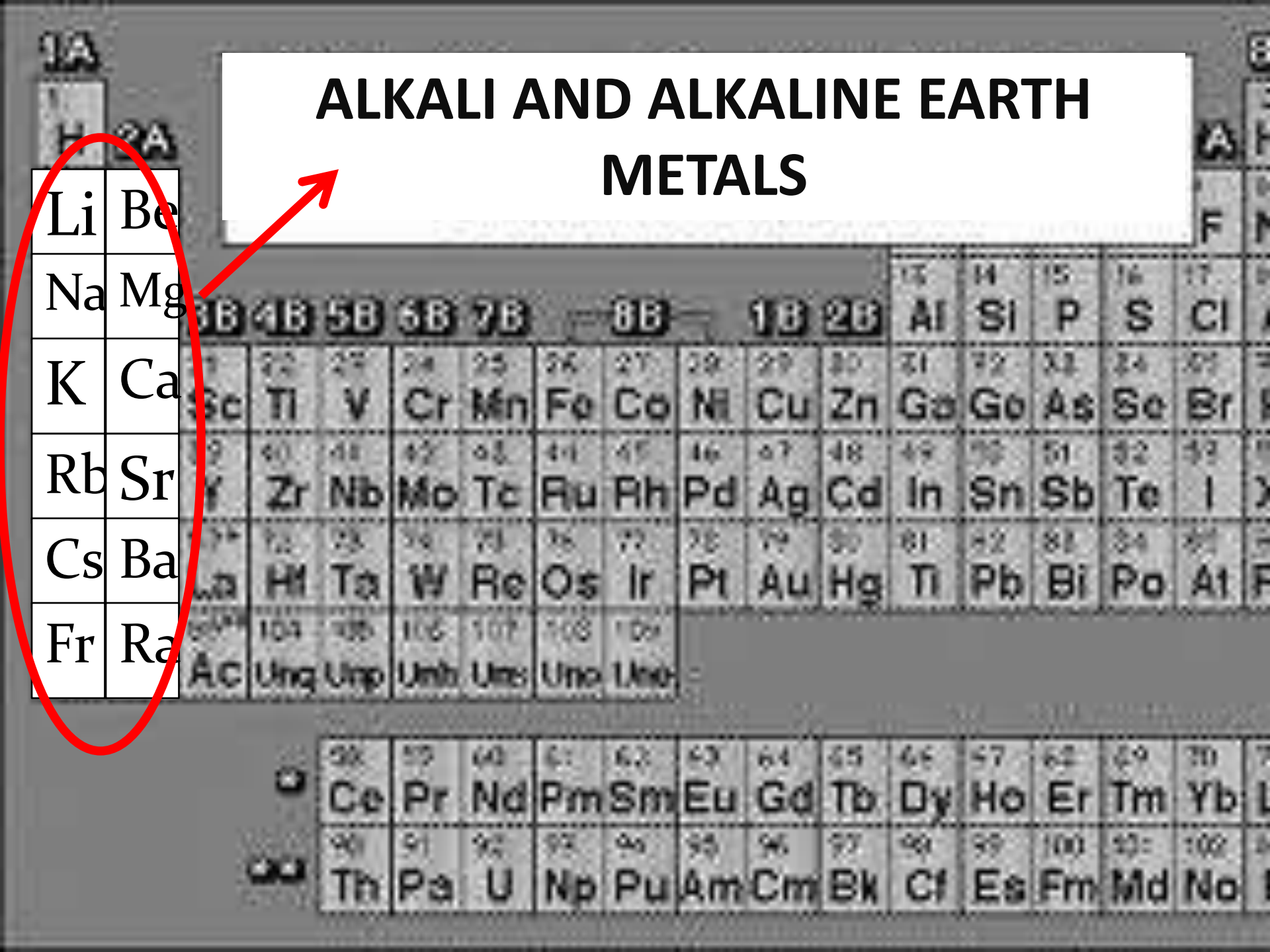
Alkali and Alkaline Earth Metals

- **are a group of chemical elements in the periodic table with very similar properties.**

ALKALI AND ALKALINE EARTH METALS



Alkali Metals

- **Found in group 1 of the periodic table (formerly known as group IA),**
- **Also called as active elements.**
- **Are very reactive metals that do not occur freely in nature.**
- **The alkali metals are softer than most other metals.**

Alkali Metals

Properties of Alkali Metals:

- **They are all *soft, shiny, malleable, ductile, good conductors of heat and electricity , react vigorously with water and they have one electron in the highest (outermost)energy level.***
- **Therefore, they are ready to lose that one electron in ionic bonding with other elements.**
- ***This group consists of the elements:* Lithium (Li), Sodium (Na), Potassium (K), Rubidium (Rb), Cesium (Cs) and Francium (Fr).**

Alkali Metals

- **Cesium and francium are the most reactive elements in this group. Alkali metals can explode if they are exposed to water.**

LITHIUM

- **Lithium (Li) – From *Lithus* , or stone.**
  - **The lightest in weight of all metals.**
  - **When alloyed with aluminum , finds great use in aircraft construction.**
  - **DISCOVERY: 1817 by Johann A. Arfvedson of Sweden**
  - **Uses: Lubricants, dry cells , storage batteries, glass and pharmaceuticals**

SODIUM

- **Sodium (Na) – From *soda* and *natrium*.**
  - **Is a necessary constituent of plant and animal tissue.**
  - **Pure sodium is poisonous and very corrosive.**
  - **Discovery: 1807 by Sir Humphry Davy of Britain**
  - **Uses: Salt, glass, metal purifier, soap, paper , textile.**

POTASSIUM

- **Potassium (K) - from *potash* and *kalium* .**
  - **A constituent of all plant and animal tissue as well as of fertile soil. Although slighty radioactive.**
  - **a prime element in fertilizers.**
  - **DISCOVERY: 1807 by Sir Humphry Davy of Britain**
  - **USES: Fertilizers; Heat transfer agent; "Strike anywhere" matches, fireworks, explosives**

RUBIDIUM

- **Rubidium(Rb)**
  - **From *rubidus* or red.**
  - **After Cesium it is the most active of the alkali metals; and the most widely distributed element.**
  - **It is also found in small quantities tea, coffee, tobacco, and other plants.**
  - **Discovery: 1860 by Robert Wilhelm Bunsen and Gustav Robert Kirchhoff of Germany**
  - **USES: Gas scavenger in vacuum, photocell component, thermo electric generator**

CESIUM

Cesium (Cs)

- From *caesius,* or sky blue.
- It is the softest metal since it is liquid at room temperature (83 °F) or (28 °C) .
- The natural source producing the greatest quantity of cesium is the rare mineral *pollux (or pollucite).*
- DISCOVERY: 1860 by Bunsen and Kirchhoff of Germany
- Uses: Photoelectric cells, "Getter " in electron tubes, atomic clocks.

FRANCIUM

- **FRANCIUM (Fr)**
  - For ***France***. The **heaviest of the alkaline metals** and the **most electropositive element.**
  - **Has never actually been seen since it is a short-lived product of the decay of actinium.**
  - **DISCOVERY : 1939, by Marguerite Perey of France**
  - **NO USES KNOWN**

Alkaline Earth Metals

- **Also called as Group II A elements.**
- **All alkaline earth elements have an oxidation number of +2, making them very reactive. Because of their reactivity, the alkaline earth metals are not found free in nature.**
- **Beryllium (Be), Calcium (Ca), Strontium (Sr), Barium (Ba) , and Radium (Ra)**

BERYLLIUM

- **Beryllium (Be)**
  - **From the mineral *beryl* , an aluminum beryllium silicate. Although beryllium products are safe to use and handle, the fumes and dust released during fabrication are highly toxic.**
  - **Discovery: 1797 by Louis Nicolas Vauquelin of France; First isolated in 1828 Friedrick Wohler and Antonine Alexandre Brutus Bussy**
  - **USES: watch spring; space shuttle parts ; welding electrodes; x-ray tubes; computers; lasers; televisions ; oceanographic instruments.**

MAGNESIUM

- **MAGNESIUM (MG)**
  - From *Magnesia* an ancient city in asia.
  - Except Beryllium, Magnesium is the lightest metal that remains stable under ordinary conditions.
  - It offers the greatest strength for weight among metals but readily corrodes.
  - DISCOVERY: 1808 by Sir Humphry Davy of Britain
  - USES: Bicycle parts, Bricks for furnaces, Medicine, Propellants.

CALCIUM

- **Calcium (Ca)**
  - **From *calx*, or *lime*.**
  - **Calcium is a ductile and malleable metal.**
  - **When exposed to the air it rapidly tarnish to yellow. It reacts violently with water ; forming the hydroxide and releasing hydrogen. Essential for teeth and bone development.**
  - **DISCOVERY: 1808 by SIR DAVY of BRITAIN**
  - **USES: Plaster of Paris , Deodorizer, Batteries; Portland cement , Medicine .**

STRONTIUM

- **STRONTIUM (Sr)**
  - **From *Strontian*, Scotland.**
  - **It has the reverse effect of Calcium on the body since radioactive strontium 90 can cause cancer.,**
  - **DISCOVERY: 1790 by Sir Davy of Britain**
  - **USES: Fireworks, glass for TV Ferrite magnet.**

BARIUM

- **BARIUM (BA)**
  - From *Barys*, heavy or dense.
  - A highly reactive metal. Reacts vigorously with water and rapidly corroded by most air .
  - DISCOVERY: 1808, by Sir Davy of Britain
  - USES: Spark plugs , rubber , paint , glass, X-ray, rat poison, fireworks.

RADIUM

- **Radium (Ra)**
  - From ***Radius***, or ray.
  - Upon exposure to air the element oxidizes immediately .
  - Emit alpha, beta, and gamma rays.
  - DISCOVERY: 1898, by Pierre and Marie Curie of France
  - USES: Radiation source, self-luminous paints, radiotherapy device.

Melting and Boiling Points of Elements

ALKALI METALS	Melting Point (°C)	Boiling Point (°F)
Lithium	181	1342
Sodium	98	883
Potassium	63	760
Rubidium	39	686
Cesium	28	669

Melting and Boiling Points of Elements

ALKALINE EARTH METALS	Melting Point (K)	Boiling Point (K)
Beryllium	1562	2745
Magnesium	924	1363
Calcium	1124	1767
Strontium	1062	1655
Barium	1002	2078
Radium	973	(1973)(uncertain)