

COMMON REACTIONS

With Water to Form Bases and Hydrogen Gas

Example: $2\text{Na}(s) + 2\text{H}_2\text{O}(l) \longrightarrow 2\text{NaOH}(aq) + \text{H}_2(g)$

Li, K, Rb, and Cs also follow this pattern.

With Acids to Form Salts and Hydrogen Gas

Example: $2\text{Na}(s) + 2\text{HCl}(aq) \longrightarrow 2\text{NaCl}(aq) + \text{H}_2(g)$

Li, K, Rb, and Cs also follow this pattern.

With Halogens to Form Salts

Example: $2\text{Na}(s) + \text{F}_2(g) \longrightarrow 2\text{NaF}(s)$

Li, K, Rb, and Cs also follow this pattern in reacting with F_2 , Cl_2 , Br_2 , and I_2 .

With Oxygen to Form Oxides, Peroxides, or Superoxides

Lithium forms an oxide.

$4\text{Li}(s) + \text{O}_2(g) \longrightarrow 2\text{Li}_2\text{O}(s)$

Sodium also forms a peroxide.

$2\text{Na}(s) + \text{O}_2(g) \longrightarrow \text{Na}_2\text{O}_2(s)$

Alkali metals with higher molecular masses can also form superoxides.

$\text{K}(s) + \text{O}_2(g) \longrightarrow \text{KO}_2(s)$

Rb and Cs also follow this pattern.

Alkali-Metal Oxides with Water to Form Bases

Oxides of Na, K, Rb, and Cs can be prepared indirectly.

These basic anhydrides form hydroxides in water.

Example: $\text{K}_2\text{O}(s) + \text{H}_2\text{O}(l) \longrightarrow 2\text{KOH}(aq)$

Li, Na, Rb, and Cs also follow this pattern.



A small piece of potassium dropped into water will react explosively, releasing H_2 to form a strongly basic hydroxide solution. The energy of the reaction ignites the hydrogen gas that is produced.

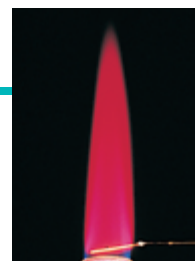


Sodium reacts vigorously with chlorine to produce NaCl . Most salts of Group 1 metals are white crystalline compounds.

ANALYTICAL TEST

Alkali metals are easily detected by flame tests because each metal imparts a characteristic color to a flame.

When sodium and potassium are both present in a sample, the yellow color of the sodium masks the violet color of the potassium. The violet color can be seen only when the combined sodium-potassium flame is viewed through a cobalt-blue glass. The glass blocks the yellow flame of sodium and makes it possible to see the violet flame of potassium.



Lithium



Sodium



Potassium



Rubidium



Cesium