



# Chem!stry

Name: ..... ( )

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## Compare and Contrast the Reactions of Lithium and Potassium with Water

(Robert Swartz and Stephen Fisher)

Lithium + Water

Potassium + Water

How are they similar to each other?

- Both lithium and potassium are less dense than water and therefore float on the surface of the water.
  - Both lithium and potassium move about on the surface of the water.
    - Both lithium and potassium react vigorously with cold water.
- Effervescence is observed when both lithium and potassium react with cold water (hydrogen gas is produced).
  - Both lithium and potassium produce a soluble, alkaline reaction product (LiOH and KOH).
- The reactions of lithium and water and potassium and water are both exothermic (energy is released causing, an increase in temperature).

How are they different from each other?

- The lithium remains in the solid state throughout the reaction, it does not melt.
  - The reaction between lithium and water is slower / less vigorous than the reaction between potassium and water.
- The hydrogen gas that is produced does not ignite.

With regard to...

• Physical State

• Rate of Reaction

• Combustion of H<sub>2</sub>

- The potassium melts and changes into a molten sphere of potassium.
  - The reaction between potassium and water is faster / more vigorous than the reaction between lithium and water.
- The hydrogen gas that is produced ignites and burns with a lilac flame.

### Conclusions:

- There are many similarities between the reactions of lithium and potassium with cold water. Both lithium and potassium are in Group I of the Periodic Table and have similar chemical properties due to the similarities in their electronic configurations i.e. they both have one electron in their valence shell and therefore react to form cations with a single positive charge.
- The main differences in the ways that lithium and potassium react with cold water is to do with the *rate* of the reaction. Potassium is more reactive than lithium, and the trend is that the reactivity of the Group I metals *increases* upon descending the Group.