# Alkali

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*For the place in Azerbaijan, see Alçalı. For other uses, see Alkali (disambiguation).*

In chemistry, an **alkali** (/ˈælkəlaɪ/; from Arabic: *al-qaly* القلي, القالي ) is a basic, ionic salt of an alkali metal or alkaline earth metal chemical element. Some authors also define an alkali as a base that dissolves in water. A solution of a soluble base has a pH greater than 7.0. The adjective **alkaline** is commonly, and **alkalescent** less often, used in English as a synonym for basic, especially for soluble bases. This broad use of the term is likely to have come about because alkalis were the first bases known to obey the Arrhenius definition of a base, and they are still among the most common bases.

## Etymology

The word "alkali" is derived from Arabic *al qalīy* (or *alkali*), meaning *the calcined ashes* (see calcination), referring to the original source of alkaline substances. A water-extract of burned plant ashes, called potash and composed mostly of potassium carbonate, was mildly basic. After heating this substance with calcium hydroxide (*slaked lime*), a far more strongly basic substance known as *caustic potash* (potassium hydroxide) was produced. Caustic potash was traditionally used in conjunction with animal fats to produce soft soaps, one of the caustic processes that rendered soaps from fats in the process of saponification, one known since antiquity. Plant potash lent the name to the element potassium, which was first derived from caustic potash, and also gave potassium its chemical symbol **K** (from the German name Kalium), which ultimately derived from al**k**ali.

## Common properties

Alkalis are all Arrhenius bases, ones which form hydroxide ions (OH-) when dissolved in water. Common properties of alkaline aqueous solutions include:

* Moderately concentrated solutions (over 10−3 M) have a pH of 7.1 or greater. This means that they will turn phenolphthalein from colorless to pink.
* Concentrated solutions are caustic (causing chemical burns).
* Alkaline solutions are slippery or soapy to the touch, due to the saponification of the fatty substances on the surface of the skin.
* Alkalis are normally water soluble, although some like barium carbonate are only soluble when reacting with an acidic aqueous solution.

## Difference between alkali and base

The terms "base" and "alkali" are often used interchangeably, particularly outside of the context of chemistry and chemical engineering.

There are various definitions for the concept of an alkali. Alkalis are sometimes defined as a subset of the bases. However, two subsets are commonly chosen.

* A basic salt of an alkali metal or alkaline earth metal (This includes Mg(OH)2 but excludes NH3.)
* Any base that is soluble in water and forms hydroxide ions or the solution of a base in water. (This excludes Mg(OH)2 but includes NH3.)

The second subset of bases is also called an "Arrhenius base".

## Alkali salts

Alkali salts are soluble hydroxides of alkali metals and alkaline earth metals, of which common examples are:

* Sodium hydroxide (often called "caustic soda")
* Potassium hydroxide (commonly called "caustic potash")
* lye (generic term, for either of the previous two, or even for a mixture)
* Calcium hydroxide (saturated solution known as "limewater")
* Magnesium hydroxide is an example of an atypical alkali since it has low solubility in water (although the dissolved portion is considered a strong base due to complete dissociation of its ions).

## Alkaline soil

Soils with pH values higher than 7.3 are usually defined as being alkaline. These soils can occur naturally, due to the presence of alkali salts. Although some plants do prefer slightly basic soil (including vegetables like cabbage and fodder like buffalograss), most plants prefer a mildly acidic soil (with pHs between 6.0 and 6.8), and alkaline soils can cause problems.

## Alkali lakes

In *alkali lakes* (or *soda lakes*), evaporation concentrates the naturally occurring carbonate salts, giving rise to an alkalic and often saline lake.

Examples of alkali lakes:

* [Alkali Lake](http://en.wikipedia.org/wiki/Alkali_Lake_%28Oregon%29), [Lake County, Oregon](http://en.wikipedia.org/wiki/Lake_County%2C_Oregon)
* [Baldwin Lake](http://en.wikipedia.org/wiki/Baldwin_Lake_%28San_Bernardino_County%2C_California%29), [San Bernardino County, California](http://en.wikipedia.org/wiki/San_Bernardino_County%2C_California)
* [Mono lake](http://en.wikipedia.org/wiki/Mono_lake), near [Owens Valley](http://en.wikipedia.org/wiki/Owens_Valley) in [California](http://en.wikipedia.org/wiki/California)
* [Redberry Lake, Saskatchewan](http://en.wikipedia.org/wiki/Redberry_Lake%2C_Saskatchewan)
* [Summer Lake](http://en.wikipedia.org/wiki/Summer_Lake_%28Oregon%29), [Lake County, Oregon](http://en.wikipedia.org/wiki/Lake_County%2C_Oregon)
* [Tramping Lake, Saskatchewan](http://en.wikipedia.org/wiki/Tramping_Lake%2C_Saskatchewan)
* [Lake Magadi](http://en.wikipedia.org/wiki/Lake_Magadi) in Kenya
* [Lake Turkana](http://en.wikipedia.org/wiki/Lake_Turkana) in [Kenya](http://en.wikipedia.org/wiki/Kenya) (the largest alkali lake in the world)
* There are also alkali lakes in the outback of Australia.
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