

# Aluminium – Hall and Héroult, a remarkable coincidence

## Topics

Metals, reactivity series, chemists, industrial chemistry

Aluminium is the third most common element in the Earth's crust. At 8.1% it follows oxygen (46.6%) and silicon (27.7%). It is mostly found in aluminosilicate rocks and clays. Despite its abundance, aluminium was once as expensive as silver, largely because it was so difficult to extract. In fact Louis Napoleon, the Emperor of France from 1848 to 1870, had a state dinner service and a ceremonial helmet made from aluminium. At this time, aluminium was extracted from its ores by heating aluminium chloride with potassium or sodium – costly and difficult processes. These metals are required in a chemical extraction of aluminium because they are among the few metals which will displace aluminium from its compounds. Although aluminium appears unreactive in everyday situations, it is in fact high in the reactivity series of metals. Its apparent docility is due to the formation of an oxide layer on its surface which is difficult to remove.

Nowadays, aluminium is a relatively cheap metal thanks to a process of extraction in which molten aluminium is electrolysed. This process, called the Hall-Héroult process was developed almost simultaneously by 1886 by the American chemist Charles Martin Hall and the Frenchman Paul Héroult. The two chemists worked independently and on different sides of the Atlantic, so it is remarkable that they both discovered the process in the same year, 1886. However, this is not the only remarkable coincidence that links the two men – both were born in the same year (1863) and died in the same year (1914).

The Hall-Héroult process is the basis of the present-day industrial extraction of aluminium.