

Carl Gustaf Mosander Biography

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Biography

A large share of the credit for unraveling the complex nature of the rare earth elements goes to Carl Gustaf Mosander. Mosander was born in Kalmar, Sweden, on September 10, 1797. He was educated as a physician and pharmacist and served as an army surgeon for many years.

Perhaps his most important professional association was with the eminent Swedish chemist J. J. Berzelius. Mosander lived with Professor and Mrs. Berzelius for many years and worked as Berzelius' assistant at the Stockholm Academy of Sciences. Eventually, Mosander became curator of minerals at the Academy and, in 1832, succeeded Berzelius as Permanent Secretary of the Academy. Mosander was also Professor of Chemistry and Mineralogy at the Caroline Institute for many years.

Mosander became interested in the rare earth elements in the late 1830s. Fifty years earlier, a Swedish army officer, Carl Axel Arrhenius, had discovered a new mineral that he named *ytterite* near the small town of Ytterby. Chemists spent much of the next century trying to separate the mineral into its many chemically-similar parts.

The first breakthrough in this effort occurred in 1794 when Johan Gadolin (1760-1852) showed that ytterite contained a large fraction of a totally new oxide, which he called *yttria*. A decade later, M. H. Klaproth, Berzelius, and Wilhelm Hisinger (1766-1852) showed that ytterite also contained a second oxide, which they called *ceria*.

Mosander first concentrated his efforts on the ceria part of ytterite. In 1839, he found that the ceria contained a new element which he named lanthanum (for hidden). Mosander did not publish his results immediately, however, because he was convinced that yet more discoveries were to be made. He was not disappointed in these hopes. In 1841, he identified a second new component of ceria. He named the component *didymium*, for "twin," because it was so closely related to lanthanum. Later research showed that didymium was not itself an element, but a complex mixture of other rare earth elements.

In 1843, Mosander turned his attention to the yttria portion of ytterite. He was able to show that the yttria consisted of at least three components. He kept the name yttria for one and called the other two *erbia*, and *terbia*. The last two of these components are now known by their modern names of erbium and terbium. Mosander is acknowledged as the discoverer, then, of three elements: lanthanum, erbium, and terbium. Mosander died in Ångsholm, Sweden, on October 15, 1858.