

TEN GREAT CHEMISTS

Amedeo Avogadro

In 1811, the Italian lawyer-turned-scientist Avogadro was investigating the properties of gases when he derived his now famous law: Equal volumes of any two gases at the same pressure contain the same number of particles. From this law, the number of particles in a mole of any substance was determined. It was named Avogadro's number. Every chemistry student and chemist has Avogadro's number. Do you?

Niels Bohr

Niels Bohr, a Danish scientist, used the observation that elements, if heated, emit energy in a set of distinct lines called a *line spectrum* to develop the idea that electrons can exist only in certain distinct, discrete energy levels in the atom. Bohr reasoned that the spectral lines resulted from the transition between these energy levels.

Bohr's model of the atom was the first to incorporate the idea of energy levels, a concept that's now universally accepted. For his work, Bohr received the Nobel Prize in 1922.

Marie Curie

Madame Curie was born in Poland, but she did most of her work in France. Her husband Pierre, was a physicist, and both were involved in the initial studies of radioactivity. Marie discovered that the mineral pitchblende contained two elements more radioactive than uranium. These elements turned out to be polonium and radium. Madame Curie coined the term *radioactivity*. She and her husband shared the Nobel Prize with Henri Becquerel in 1903.

John Dalton

In 1803, John Dalton introduced the first modern atomic theory. He developed the relationship between elements and atoms and established that compounds were combinations of elements. He also introduced the concept of atomic mass.

Unlike many other scientists who had to wait many years to see their ideas accepted, Dalton watched the scientific community readily embrace his theories. His ideas explained several laws that had already been observed and laid the ground work for the quantitative aspects of chemistry. Not too bad for a guy that started teaching at the age of 12!!!!

Michael Faraday

Michael Faraday made a tremendous contribution to the area of electrochemistry. He coined the terms, *electrolyte*, *anion*, *cation* and *electrode*. He established the laws governing electrolysis, discovered that matter has magnetic properties, and discovered several organic compounds, including benzene. He also discovered the magnetic induction effect, laying the groundwork for the electric motor and transformer.

Antoine Lavoisier

Antoine Lavoisier was a careful scientist who made detailed observations and planned his experiments. These characteristics allowed him to relate the process of respiration to the process of combustion. He coined the term *oxygen* for the gas that had been isolated by Priestly. His studies led him to the Law of Conservation of Matter, which states that matter can neither be created nor destroyed. The law was instrumental in helping Dalton develop his atomic theory. Lavoisier is sometimes called the father of chemistry.

Dmitri Mendeleev

Mendeleev is regarded as the originator of the Periodic Table, a tool that's indispensable in chemistry. He discovered the similarities in the elements while preparing a textbook in 1869. He found that if he arranged the then-known elements in order of increasing atomic weight, a pattern of repeating properties emerged. He used this concept of *periodic*, or repeating, properties to develop the first periodic table.

Mendeleev even recognized that there were holes in the Periodic Table where unknown elements should be found. Based on the periodic properties, Mendeleev predicted the properties of these elements. Later, when gallium and germanium were discovered, scientists found that these elements had properties that were very close to those predicted by Mendeleev.

Linus Pauling

If Lavoisier is the father of chemistry, then Linus Pauling is the father of the chemical bond. His investigations into the exact nature of how bonding occurs between elements were critical in the development of our modern understanding of bonding. His book, *The Nature of the Chemical Bond*, is a classic in the field of chemistry.

Pauling received a Nobel Prize in 1954 for his work in chemistry. He received another Nobel Prize for peace in 1962 for his work on limiting the testing of nuclear weapons. He's the only individual to receive two unshared Nobel Prizes. He is also well known for his advocacy on using megadoses of Vitamin C to cure the common cold.

Ernest Rutherford

Although Rutherford is perhaps better classified as a physicist, his work on the development of the modern model of the atom allows him to be placed with chemists.

He did some pioneer work in the field of radioactivity, discovering and characterizing alpha and beta particles – and received a Nobel Prize in chemistry for this work. But he's perhaps better known for his scattering experiments in which he realized that the atom was mostly empty space and that there had to be a dense positive core at the center of the atom, which is now known as the nucleus. Inspired by Rutherford, many of his former students went on to receive their own Nobel Prizes.

Glenn Seaborg

Glen Seaborg, while working on the Manhattan Project (that's the atomic bomb project), became involved in the discovery of several of the *transuranium elements* – elements with an atomic number greater than 92. Seaborg came up with the idea that the elements Th, Pa, and U were misplaced on the periodic table and should be the first three members of a new rare earth series under the lanthanides.

After World War II, he published his idea, which was met with strong opposition. He was told that he would ruin his scientific reputation if he continued to express his theory. But, as he said, he had no scientific reputation at that point. He persevered and was proven correct. He received the Nobel Prize in 1951.