

Biography: Dimitri Ivanovich Mendeleev

Dimitri Ivanovich Mendeleev (1834 – 1906) was a Russian chemist who became a professor at Saint Petersburg University. He is best known for identifying properties of elements and the creation of the periodic table of elements, which is still used today. Mendeleev devoted a great part of his life to the study of solutions, catalysis, and petroleum. He also wrote many works, including *Principles of Chemistry*.



Dimitri Mendeleev was born on February 8, 1834 in Tobolsk, a town in the western part of Siberia. He was probably the last of seventeen children (some sources suggest, however, that he was the last of fourteen children) born to Ivan Pavlovich Mendeleev and Maria Dmitrievna Mendeleev. Dimitri's father Ivan taught literature and was a head-master of an advanced secondary school, called a gymnasium. Unfortunately, Ivan lost his sight and died when Dimitri was still a young boy. His mother received a small pension, but it was not enough money to provide for her family. However, Maria was a resourceful woman and she managed to re-open a glass factory that had previously belonged to one of her relatives. Disaster struck when Dimitri was 15, and the glass factory was destroyed by fire. Consequently, Maria and her son moved to Moscow, where she hoped her son would attend university. Unfortunately, their plan failed and Dimitri entered the Main Pedagogical Institute, where gymnasium teachers were educated. He studied mathematics, physics, and chemistry and was awarded the medal of excellence for being first in his class.

Due to his poor health, he moved to Simferopol (in southern Russia) and became a teacher in the local gymnasium. Unluckily, his career was interrupted by the Crimean War, and the gymnasium where he worked was converted into a hospital. Mendeleev moved back to Saint Petersburg, where he became employed as an assistant in the General Chemistry Cathedral of the University. After two years, in 1857, he began delivering lectures for students.

In January, 1859, Mendeleev moved and spent two years abroad. At the beginning, he studied in Paris under the supervision of Professor Henri Victor Regnault. Later, he travelled to Heidelberg, where he continued his research, this time study-

ing the solutions under the guidance of Robert Bunsen and Gustav Kirchoff.

All scientists who were interested in atoms and elements at that time, arranged to have an international conference in Karlsruhe, West Germany.

In 1860, Dimitri attended the Karlsruhe Congress, where he met many leading chemists of that time. Undoubtedly, it had a tremendous impact on young Mendeleev, because only two years after this event he wrote his dissertation “On the Combinations of Water with Alcohol” and became a professor of chemistry at the University in Saint Petersburg. During this time he also wrote a comprehensive textbook on organic chemistry.

As a professor, Mendeleev was highly respected and valued by his students: he was eloquent, brave and, most importantly, he was viewed as a moral and scientific authority. His lectures were attended by a great number of students from numerous departments, who were literally fighting for seats. When Mendeleev walked into classrooms he was greeted by silence, which turned immediately into standing ovations.

Influenced by his family, Dimitri proposed marriage to Feozva Nikitichna Leshcheva in 1861. Soon after the engagement, they were married in the Naval cathedral of Saint Nicholas in Saint Petersburg. They had two children together: Vladimir and Olga. Unfortunately, because of personality differences, their marriage ended in divorce.

Mendeleev's work at the university ended unexpectedly. Having sided with his students over a dispute, he handed the Minister of Education a petition in which the students had presented numerous demands. After being punished for his action, he resigned from the university position and was appointed as the Director of the Bureau of Weights and Measures. He remained at this position for the rest of his life.

His research influenced many different areas of science. His works were related to the theory of solutions, mass, weight, and gases. He also presented a hypothesis regarding Abiogenic Petroleum Origin, and predicted the possibility of extracting many important chemical compounds out of petroleum. Dmitri also made his mark in the field of physics, natural sciences, and economics. Mendeleev was interested in solar eclipses, the movements of the pendulum clock, the existence of the cosmic ether, mining, and expeditions in the polar ice. Among his many publications is even a thesis about Russian customs tariffs.

His most important achievement is considered to be the discovery of the periodic table of elements. Mendeleev's classification was based on the periodic law. The periodic law did not determine the length of the period, but presented the existence of a recurring pattern in the properties of elements arranged in order of increasing atomic weights.

In 1869, the Russian Chemical Society announced the first information about his discovery and the Society's newspaper presented his article "The Dependence Between the Properties of the Atomic Weights of the Elements." A year later, Dmitri wrote another detailed article regarding the periodic law.

Mendeleev claimed that the division into octaves used by English chemist John Alexander Reina Newlands in 1865 could not be applied to all chemical elements. He thought that after the first two octaves, each consisting of seven chemical elements (noble gases were unknown at that time), come groups consisting of seventeen elements. Another notable achievement was discovering that the lack of pattern in the arrangement of the elements was not due to the periodic system, but because of mistakes in the evaluation of the atomic weight of these elements. Mendeleev proved this after conducting numerous experiments on chemical elements. By doing so, the periodic system was fully vindicated.

Whenever Dmitri came across a new chemical element whose properties were entirely different from other elements in its group, he left a gap and placed the element among similar ones in another group. It enabled him to predict the characteristics

of elements that were virtually unknown at the time. Mendeleev named some of these elements eka-boron, eka-aluminum and eka-silicon.

When the elements that Mendeleev had predicted were eventually discovered, Mendeleev's periodic table of elements was proven correct. Since its development, the periodic table of elements has laid the foundations for the development of chemistry as we know it. It has brought order and coherence. The table itself is flexible and is still developing. Even Dmitri knew that his discovery was not a finished product.

Mendeleev died at the age of 72 in Saint Petersburg. A crater on the Moon, a planetoid, and the radioactive element number 101 were named in his honor.

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