

Nobel Prize in Chemistry 1901



Jacobus Henricus van 't Hoff

The Nobel Prize in Chemistry 1901 was awarded to Jacobus H. van 't Hoff *"in recognition of the extraordinary services he has rendered by the discovery of the laws of chemical dynamics and osmotic pressure in solutions"*.

RESEARCH INFORMATION:

The Academy has awarded the Nobel Prize for Chemistry to Jacobus Henricus van 't Hoff, Professor in the University of Berlin, for his pioneering work on chemical dynamics and osmotic pressure in solutions.

As a result of his investigations in the fields of atomic and molecular theory van 't Hoff has made the most important discoveries in theoretical chemistry since Dalton's time.

With regard to atomic theory van 't Hoff, following an idea put forward by Pasteur, advanced the hypothesis that the elementary atoms have attachment points geometrically oriented in space - a hypothesis which in so far as carbon compounds are concerned led to the theory of the asymmetry of carbon atoms and to the founding of stereochemistry.

Still more revolutionary were van 't Hoff's discoveries in the field of molecular theory. van 't Hoff's investigations showed that the law, which has been named after the

Italian Avogadro, according to which the number of gas molecules in a given volume is the same for all gases at the same pressure and temperature, embraces not only substances in the gaseous phase but also those in solution, provided that their pressure, known as osmotic pressure, is taken into account in the same way as the gas pressure in the case of gases. He proved that gas pressure and osmotic pressure are identical, and thereby that the molecules themselves in the gaseous phase and in solutions are also identical. As a result of this the concept of the molecule in chemistry was found to be definite and universally valid to a degree hitherto undreamed-of. He also discovered how to express the state of chemical equilibrium in reactions and the electromotive force which a reaction can produce; he explained how the transition occurs between the various modifications of the elements, between hydrates of differing water contents, how double salts are formed, etc.

By applying these simple principles, which were originally borrowed from mechanics and thermodynamics, van 't Hoff became one of the founders of chemical dynamics. His researches have been a substantial factor in bringing about the magnificent advances in physical chemistry, in which field his discoveries match the great contributions which other investigators, including those in our country, have made in the field of electrochemistry and in the theory of chemical reaction. This has opened up great prospects for scientific research. On the other hand, the investigations on the state of substances in solutions have had and will continue to have the greatest practical consequences - consequences whose benefit to mankind can best be appreciated if we remember that chemical reactions occur predominantly in solutions and that the vital functions of living organisms are maintained by metabolic processes which take place in solutions.

For more details please visit:

http://www.nobelprize.org/nobel_prizes/chemistry/laureates/1901/press.html