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Jacobus Henricus Van't Hoff and his role to shape the Chemistry

Dr. Jacobus Henricus Van't Hoff (30 August 1852 – 1 March 1911) was the first winner of the Nobel Prize in Chemistry. A highly influential theoretical chemist of his time. His revolutionary effort helped to developed the modern theory of chemical affinity, chemical equilibrium, chemical kinetics and chemical thermodynamics. In 1874, van't Hoff formulated the theory of the tetrahedral carbon atom and assigned the foundations of stereochemistry. In 1875, he predicted the correct structures of allenes and cumulenes as well as their axial chirality.

Dr. van't Hoff is also widely recognized as one of the founders of physical chemistry. In 1884, Dr.Van't Hoff published his research on chemical kinetics, in the book named, "Études de dynamique chimique" (Studies in Chemical Dynamics). In this, he considered the principles of thermodynamics to provide a mathematical model for the rates of chemical reactions based on the changes in the concentration of reactants with time. He displays the relationship between the concentration of compounds in a chemical reaction and the rate at which the reaction proceeds. He was also able to show how the science of thermodynamics can be applied to chemical equilibrium.Van't Hoff also discussed in this work the speed of a chemical reaction and its relation to temperature. Van't Hoff showed how the previously independently developed concepts of dynamic equilibrium (that chemical equilibrium results when the rates of forward and reverse reactions are equal), the Law of Mass action (that the concentration of substances affects the rate of reaction), and the equilibrium constant (the ratio of the concentrations of starting materials to products at equilibrium) together formed a consistent model for understanding the nature of chemical reactions.

Finally, he showed mathematically how temperature, pressure, and mass affected the rate of chemical reactions and how the heat generated by a reaction could be calculated from the mathematical equation governing the final equilibrium state. He is also well known for the concept of Osmotic Pressure and Van't Hoff Factor Osmotic Pressure Phenomenon: Osmotic Pressure is defined as the measure of the tendency of a solution to take in water by osmosis. Osmotic Pressure is of vital importance in biology as the cell's membrane is selective toward many of the solutes found in living organisms. Osmotic Pressure phenomenon of osmotic pressure arises from the propensity of a pure solvent to move through a semi-permeable membrane and into a solution containing a solute to which the membrane is impermeable. Van't Hoff Factor: Van't Hoff factor is a measure of the effect of a solute upon colligative properties such as osmotic pressure, relative lowering in vapor pressure, elevation of boiling point and freezing point depression. The van't Hoff factor is the ratio between the actual concentration of particles produced when the substance is dissolved, and the concentration of a substance as calculated from its mass. Here, a brief professional biography of Dr. Jacobus Henricus van't Hoff will be present, which will include his early life education as well as his contribution to chemistry.

Biography

Manju K Saroj has her expertise in working experimentally and theoretically on photo-physical properties of the biologically active molecules like Isatin Chalcone, Indole Chalcones and Thymol based Schiff's bases. She has done extensive study related to specific and non-specific interaction of various probe in heterogeneous and homogenous media by considering their absorption and fluorescence spectral profile.

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