2012

Linus Pauling: Scientist of the 20th Century

Laura Ward
Parkland College

Recommended Citation
http://spark.parkland.edu/nsps/42

Open access to this Poster is brought to you by Parkland College's institutional repository, SPARK: Scholarship at Parkland. For more information, please contact spark@parkland.edu.
Linus Pauling was born in Portland, Oregon in February of 1901. His father was a self-taught physician and his family moved to the small town of Condon where he was a strict man who forbade his children from playing outside. Pauling had a strong interest in science from a young age and was frequently seen reading scientific journals and books in his father's library. He attended Willamette University in Oregon and later transferred to the University of California, Berkeley, where he received his Ph.D. in Chemistry in 1925.

Linus Pauling was a co-recipient of the 1954 Nobel Prize in Chemistry for his work on the nature of the chemical bond and the cause of diseases in proteins. He was also a co-recipient of the 1962 Nobel Peace Prize for his work in the field of molecular biology and his contributions to the understanding of the structures of proteins and viruses.

One of Pauling's most important contributions to the field of molecular biology was the discovery of the alpha helix protein structure. The alpha helix consists of a single chain of amino acids and is a main protein structure present in a variety of common substances such as keratin. The alpha helix model also provided a basis for understanding the structures of many common proteins.

Linus Pauling was born in Portland, Oregon in February of 1901. His father was a self-taught physician and his family moved to the small town of Condon where he was a strict man who forbade his children from playing outside. Pauling had a strong interest in science from a young age and was frequently seen reading scientific journals and books in his father's library. He attended Willamette University in Oregon and later transferred to the University of California, Berkeley, where he received his Ph.D. in Chemistry in 1925.

Linus Pauling was a co-recipient of the 1954 Nobel Prize in Chemistry for his work on the nature of the chemical bond and the cause of diseases in proteins. He was also a co-recipient of the 1962 Nobel Peace Prize for his work in the field of molecular biology and his contributions to the understanding of the structures of proteins and viruses.

Hybridization Overview:
- One of Pauling's greatest achievements was the development of hybridization theory which explains the observed geometry of molecules. The model serves as an excellent tool for predicting the structure of organic compounds and is still relevant and used extensively today.
- The structure of benzene:
  - Pauling's theory and was immediately applied to classify the structure of molecules such as benzene.
  - Without the application of resonance theory it was all but impossible to develop a model of benzene that accounted for its many properties.
  - The closest model at the time was suggested by chemist Friedrich Kekulé. He assumed that benzene existed in two states and that the molecule shifts continuously back and forth between the two states.
  - Pauling instead proved that the true structure of benzene is a separate intermediate consisting of the superposition of the possible Lewis structures without any inter-conversion from one form to another.

Resonance
- Pauling also developed the idea of resonance and used it to explain the structure of compounds with delocalized electrons. Pauling determined that in certain situations multiple Lewis structures may be necessary to describe a compounds structure. Through his research it was discovered that compounds true structure is actually the result of the superposition of its Lewis structures.

Pauling also devoted much of his life to activism, calling for the reduction of nuclear arms. Through his efforts Pauling was able to deliver a petition to the United Nations in 1958 calling for the end to nuclear weapons, the petition had been signed by over eleven thousand other scientists from around the world.

Pauling received numerous awards over the course of his career including two Nobel Prizes. His first Nobel Prize was awarded in 1954 in the area of chemistry, for his work on the structure of chemical bonds. In 1962 Pauling was awarded his Nobel Peace Prize for his many years of humanitarian work and activism in the area of nuclear arms reduction. Pauling was still the only person to earn two unshared Nobel Prizes, although he argued that the peace prize should have been shared with his wife for all of her efforts.

Linus Pauling was one of the best in the word at what he was doing and was called a "superhuman" by his peers. His work has had a profound impact on the field of chemistry and molecular biology and continues to influence research in these areas today.