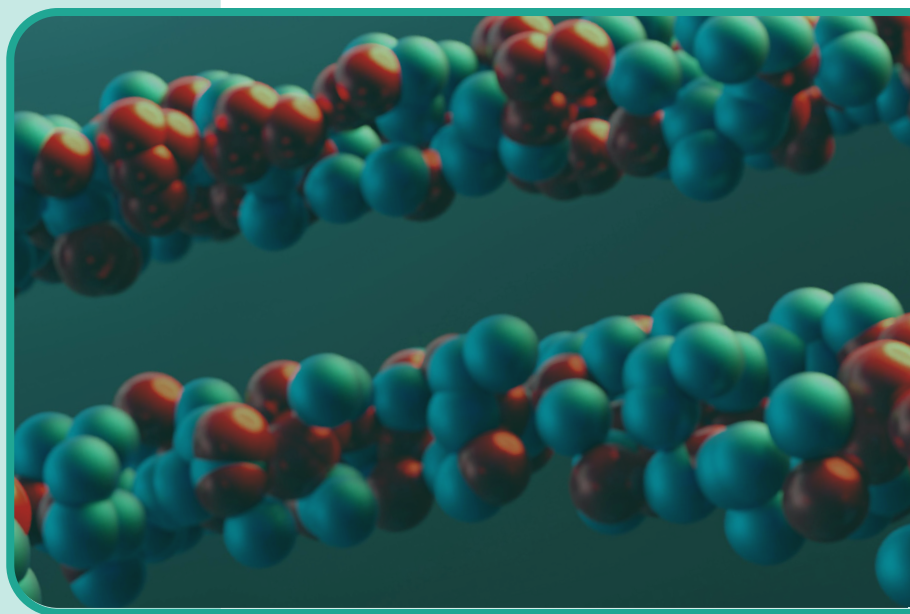


CONCEPT Electrostatic bonds refer to the attractive forces that exist between oppositely charged particles. In the context of atoms, electrostatic bonds result from the attraction between positively charged atomic nuclei and negatively charged electrons. Therefore, the selected focus area is the relationship between valence electrons and electrostatic bonds in chemical bonding.

TERMINOLOGY

IONIC BONDS: Ionic bonds are chemical bonds formed between two atoms that have significantly different electronegativities. In this type of bond, one atom donates one or more electrons to another atom to create oppositely charged ions that attract each other due to their opposite charges.

COVALENT BONDS: Covalent bonds are chemical bonds formed when two or more atoms share one or more pairs of electrons to achieve a more stable electron configuration. This type of bond is typically formed between atoms with similar electronegativities.



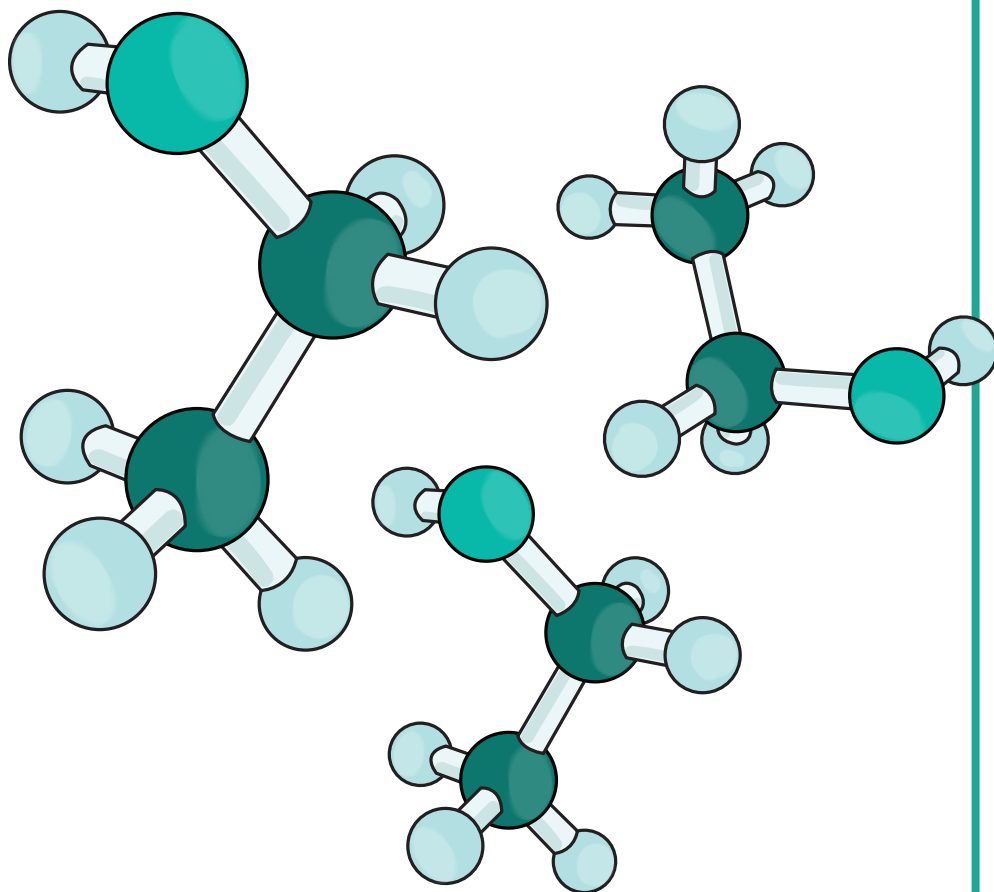
APPLICATION

One application of valence electrons and electrostatic bonds can be seen in the creation of ionic liquids, which are a type of salt that is liquid at room temperature. Ionic liquids have several unique properties that make them useful in various industries, such as their low volatility, high thermal stability, and high ionic conductivity.

The creation of ionic liquids typically involves the combination of a cation, which is a positively charged ion, and an anion, which is a negatively charged ion. The electrostatic attraction between the oppositely charged ions creates a strong bond that keeps the ions together in the liquid state.

*Make sure it measures up***EXAMPLE**

LEWIS STRUCTURES: These are diagrams that show the bonding between atoms in a molecule, indicating which atoms are bonded together and which valence electrons are involved in the bond.

**REAL WORLD CONNECTIONS**

Valence electrons and electrostatic bonds play a critical role in energy production. Chemical reactions that occur in power plants, such as combustion and oxidation, rely on the transfer of electrons and the formation of electrostatic bonds.

Nebraska is home to several chemical and manufacturing industries that rely on the concepts of valence electrons and electrostatic bonds. For example, Nebraska is a significant producer of ethanol, a biofuel produced through a chemical process that involves the transfer of electrons and the formation of chemical bonds.

FORMULAS

ELECTRONEGATIVITY: This is a measure of an atom's ability to attract electrons towards itself when it is involved in a chemical bond. The Pauling scale is commonly used to assign electronegativity values to elements, with fluorine having the highest value of 4.0.

COULOMB'S LAW: This law describes the electrostatic force between two charged particles, such as electrons and protons. The formula is $F = k(q_1q_2)/r^2$, where F is the force, k is Coulomb's constant ($8.99 \times 10^9 \text{ Nm}^2/\text{C}^2$), q_1 and q_2 are the charges of the two particles, and r is the distance between them.



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