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Calcium chloride in solid form does not conduct electricity because it consists of ions that are not free to move. However, when dissolved in water, calcium chloride dissociates into calcium and chloride ions, allowing them to move freely and conduct electricity.

Electron dot structure, Ionic compounds, Electrical conductivity

Explanation: To explain the formation of Calcium Chloride (CaCl) using electron dot structures, we first look at the electron configurations of Calcium and Chlorine. Calcium (Ca) has an atomic number of 20, which means it has 2 electrons in its outermost shell (4s). Chlorine (Cl), with an atomic number of 17, has 7 electrons in its outermost shell (3s3p).

(a) Calcium tends to lose its 2 outer electrons to achieve a stable electron configuration (similar to Argon). When it loses these electrons, it becomes a Ca ion. Each Chlorine atom needs 1 electron to complete its outer shell, so it gains an electron from Calcium, forming Cl ions. The electron dot structure can be represented as follows: Calcium: [Ca] [Ca] + 2e Chlorine: [Cl] + e [Cl]

Thus, two Chlorine atoms will bond with one Calcium atom to form Calcium Chloride (CaCl₂). The resulting ionic compound consists of Ca and 2 Cl ions held together by strong electrostatic forces of attraction.

(b) Ionic compounds do not conduct electricity in the solid state because the ions are fixed in a rigid lattice structure and cannot move freely. However, when ionic compounds are melted or dissolved in water, the rigid structure breaks down, allowing the ions to move freely. This mobility of ions in the molten or aqueous state enables the conduction of electricity.

Step by Step Solution: Step 1 Identify the electron configurations of Calcium (Ca) and Chlorine (Cl). Ca has 2 electrons in its outer shell, and Cl has 7 electrons.

Step 2 Calcium loses 2 electrons to become Ca²⁺, while each Chlorine atom gains 1 electron to become Cl⁻.

Step 3 Write the electron dot structures: Ca Ca + 2e and Cl + e Cl.

Step 4 Combine the ions to form CaCl₂, showing that 1 Ca ion bonds with 2 Cl ions.

Final Answer: Calcium Chloride is formed by the transfer of electrons from Calcium to Chlorine, resulting in the formation of Ca²⁺ and Cl⁻ ions. Ionic compounds do not conduct electricity in solid state due to fixed ions, but conduct in molten and aqueous states due to free-moving ions.

Does calcium chloride conduct electricity? In this article, I'll help you to find out the answer. We are familiar with sodium chloride or table salt but not calcium chloride. Both calcium chloride and sodium chloride are metal chlorides. However, calcium and sodium (or any other metal chloride) have different chemical characteristics, which can be confusing. The chemistry of metal chlorides is vital to understanding how ions conduct electricity. Generally, when a grain of salt dissolves, its dissociated ions (of the respective constituent elements in the salt Calcium and chlorine ions, in our case) are free to move in solution, enabling a charge to flow. Because it has ions, the obtained solution will conduct an electrical current. More details are below.

Calcium chloride is a good conductor of electricity when it is molten. Calcium chloride is a poor heat conductor. It has a boiling point of 1935°C. It is hygroscopic and soaks up moisture from the air.

RELATED: Is Calcium a Good Conductor of Electricity? Calcium Chloride Solutions Contain Mobile Ions Which Transfer Charge or Electricity. When salt dissolves, its dissociated ions (of the respective constituent elements in the salt Calcium and chlorine ions, in our case) are free to move in solution, enabling a charge to flow. Because it has ions, the obtained solution will conduct an electrical current.

Video | Carlos Acosta Calcium chloride solid; negative results. Video | Carlos Acosta Calcium chloride solution; positive results.

RELATED: Does Lithium Conduct Electricity? Water and other highly polar compounds dissolve NaCl. Water molecules surround every cation (positive charge) and anion (negative charge). Each ion is engulfed in six water molecules. Ionic compounds in the solid state, such as NaCl, have their ions localized in position and thus cannot move. So, solid ionic compounds can't conduct electricity. Ions in ionic compounds are mobile or free to flow in a molten state so that molten NaCl can conduct electricity.

RELATED: Can Sugar Conduct Electricity? Calcium Chloride Has More Ions (3) than Sodium Chloride (2). Because NaCl has two ions and CaCl₂ has three ions, CaCl₂ is the most concentrated and, hence, has the highest conductivity. NaCl is the least concentrated (compared with CaCl₂) and has the lowest conductivity. In a nutshell, alkaline salt compounds include calcium chloride and sodium chloride. Both of these compounds contain chloride ions but in different proportions. The primary distinction between calcium chloride and sodium chloride salts is that each calcium chloride molecule contains two chlorine atoms, whereas each sodium chloride molecule contains one.

RELATED: Is Calcium a Good Conductor of Electricity? No free electrons exist in an ionic compound, such as NaCl. Strong electrostatic forces bind the electrons together in bonds. Thus, sodium chloride doesn't conduct electricity in solid form. So, the presence of mobile ions is responsible for the conductivity of NaCl in its molten state. Calcium chloride (CaCl₂) can melt ice at -20°F, which is lower than the melting temperature of any other ice melt product. NaCl only melts down to 20°F. During winter, most northern states in the United States see temperatures drop below 20°F. Calcium chloride anhydrous or Calcium dichloride is a chlorine-calcium ionic compound. It has a crystalline solid white color at ambient temperature. (298 K) It is hygroscopic because it is highly soluble in water. Conductivity is determined by ion mobility, and smaller ions are more mobile in general. When they mention water molecules, they most likely refer to hydration layers.

Video References: Carlos Acosta SHOW LESS | Japan A solution of calcium chloride conducts electricity because it contains free-moving ions that can carry electric current. Solid calcium chloride does not conduct electricity because its ions are fixed in a crystalline lattice and cannot move freely.

Penjelasan: Identify the key information. The question asks why a solution of calcium chloride conducts electricity while solid calcium chloride does not. This involves understanding the properties of ionic compounds and their behavior in solution. Explain the concept of electrical conductivity. Electrical conductivity is the ability of a substance to allow the flow of electric current. This flow is facilitated by the movement of charged particles, such as ions. Explain the behavior of calcium chloride in solution. When calcium chloride (CaCl₂) dissolves in water, it dissociates into its constituent ions: calcium ions (Ca²⁺) and chloride ions (Cl⁻). These ions are free to move throughout the solution. Explain why the solution conducts electricity. The presence of free-moving ions in the solution allows for the flow of electric current. When an electric potential is applied, the positively charged calcium ions move towards the negative electrode, and the negatively charged chloride ions move towards the positive electrode. This movement of ions constitutes the electric current. Explain why solid calcium chloride does not conduct electricity. In its solid state, calcium chloride exists as a crystalline lattice structure. The ions are held tightly in fixed positions within the lattice, and they are not free to move. Therefore, there is no mechanism for the flow of electric current in solid calcium chloride.

Why can't solid calcium chloride conduct electricity. Does calcium chloride conduct electricity when molten. Why does calcium chloride conduct electricity. Why does calcium chloride conduct electricity when molten but not when solid. Solid CaCl₂ does not conduct electricity. explain why it is considered to be an electrolyte.