Free download Concentration ions solution (2023)

when some substances are dissolved in water they undergo either a physical or a chemical change that yields ions in solution these substances constitute an important class of compounds called electrolytes substances that do not yield ions when dissolved are called nonelectrolytes an electrolyte solution conducts electricity because of the movement of ions in the solution see above the larger the concentration of ions the better the solutions conducts weak electrolytes such as hgcl 2 conduct badly because they produce few ions when dissolved low concentration of ions and exist mainly in the form of molecules solution using the names of the ions this ionic compound is named calcium chloride it is not calcium ii chloride because calcium forms only one cation when it forms an ion and it has a characteristic charge of 2 the name of this ionic compound is aluminum fluoride in comparison the complete ionic equation tells us about all of the ions present in solution during the reaction and the molecular equation tells us about the ionic compounds that were used as the sources of ag and cl for the reaction when in an aqueous solution a solution where water is the solvent potassium hydroxide dissociates into potassium and hydroxide ions we represent this with the aq symbol i e k aq and oh aq ions immediately react with water molecules to form hydronium ions h 3 o in an acid base or neutralization reaction an arrhenius acid and base usually react to form water and a salt introduction from the vinegar in your kitchen cabinet to the soap in your shower acids and bases are everywhere the solubility of ionic or polar covalent compounds often increases in solutions especially in water precipitation reactions acid base reactions and redox reactions all occur in solution the dynamic collection of water molecules surrounding an ion in solution is referred to as the solvation shell and it is the ability of water to solvate and stabilize ions that makes water such an important solvent both in chemistry and in biology an electrolyte is a compound whose aqueous solution contains ions when nacl dissolves in water the compound dissociates into na and cl ions a good test to determine whether or not a compound is an electrolyte is to measure the ability of its water solution to conduct an electrical current this example problem demonstrates how to calculate the molarity of ions in an aqueous solution molarity is a concentration in terms of moles per liter of solution because an ionic compound dissociates into its components cations and anions in solution the key to the problem is identifying how many moles of ions are produced during dissolution explanation ions are atoms that have gained or lost electrons to acquire a positive lost electron or negative gained electron charge often ions exist as part of an ionic compound this means that two ions are bound together because of their opposite charges attracting each other 3 1 introduction to the octet rule 3 2 ions and the periodic table common cations common anions ions of transition metals 3 3 ionic bonding 3 4 practice writing correct ionic formulas 3 5 naming ions and ionic compounds 3 6 polyatomic ions 3 7 naming polyatomic ions 3 8 properties and types of ionic compounds ion any atom or group of atoms that bears one or more positive or negative electrical charges positively charged ions are called cations negatively charged ions anions the ionic strength of a solution is a measure of the concentration of ions in that solution ionic compounds when dissolved in water dissociate into ions the total electrolyte concentration in solution will affect important properties such as the dissociation constant or the solubility of different salts figure pageindex 1 ionic solutions when an ionic compound dissociates in water water molecules surround each ion and separate it from the rest of the solid each ion goes its own way in solution all ionic compounds that dissolve behave this way here s how that works n acl aq n a aq cl aq sodium chloride dissociates into n a cations and cl anions when dissolved in water notice that 1 mole of n acl will produce 1 mole of n a and 1 mole of cl an ion is defined as an atom or molecule that has gained or lost one or more of its valence electrons giving it a net positive or negative electrical charge in other words there is an imbalance in the number of protons positively charged particles and electrons negatively charged particles in a chemical species history and meaning you can test for ammonium ions either in a solid or in solution by adding sodium hydroxide solution and warming gently if the compound contains ammonium ions you will get ammonia gas produced which you can test with damp red litmus paper which it turns blue test for cation test for ammonium ion with aqueous sodium hydroxide watch on how do you calculate the number of ions in a solution solution calculation of the number of ions in a solution step 1 calculating the number of moles the mole is used as a measurement or a basic unit that helps in calculating the amount of substance present in the given sample attempts to capture the number of free ions in solution which can migrate in the presence of an electric

field whereas ion pairs are not thought to contribute to this current this is expressed in terms of molar conductivity l and limiting molar conductivity l 0 according to equation 4 51 a ¼ l l 0 4 activity

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when some substances are dissolved in water they undergo either a physical or a chemical change that yields ions in solution these substances constitute an important class of compounds called electrolytes substances that do not yield ions when dissolved are called nonelectrolytes

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an electrolyte solution conducts electricity because of the movement of ions in the solution see above the larger the concentration of ions the better the solutions conducts weak electrolytes such as hgcl 2 conduct badly because they produce few ions when dissolved low concentration of ions and exist mainly in the form of molecules

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solution using the names of the ions this ionic compound is named calcium chloride it is not calcium ii chloride because calcium forms only one cation when it forms an ion and it has a characteristic charge of 2 the name of this ionic compound is aluminum fluoride

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in comparison the complete ionic equation tells us about all of the ions present in solution during the reaction and the molecular equation tells us about the ionic compounds that were used as the sources of ag and cl for the reaction

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when in an aqueous solution a solution where water is the solvent potassium hydroxide dissociates into potassium and hydroxide ions we represent this with the aq symbol i e k aq and oh aq

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ions immediately react with water molecules to form hydronium ions h 3 o in an acid base or neutralization reaction an arrhenius acid and base usually react to form water and a salt introduction from the vinegar in your kitchen cabinet to the soap in your shower acids and bases are everywhere

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the solubility of ionic or polar covalent compounds often increases in solutions especially in water precipitation reactions acid base reactions and redox reactions all occur in solution

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the dynamic collection of water molecules surrounding an ion in solution is referred to as the solvation shell and it is the ability of water to solvate and stabilize ions that makes water such an important solvent both in chemistry and in biology

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an electrolyte is a compound whose aqueous solution contains ions when nacl dissolves in water the compound dissociates into na and cl ions a good test to determine whether or not a compound is an electrolyte is to measure the ability of its water solution to conduct an electrical current

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this example problem demonstrates how to calculate the molarity of ions in an aqueous solution molarity is a concentration in terms of moles per liter of solution because an ionic compound dissociates into its components cations and anions in solution the key to the problem is identifying how many moles of ions are produced during dissolution

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explanation ions are atoms that have gained or lost electrons to acquire a positive lost electron or negative gained electron charge often ions exist as part of an ionic compound this means that two ions are bound together because of their opposite charges attracting each other

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3 1 introduction to the octet rule 3 2 ions and the periodic table common cations common anions ions of transition metals 3 3 ionic bonding 3 4 practice writing correct ionic formulas 3 5 naming ions and ionic compounds 3 6 polyatomic ions 3 7 naming polyatomic ions 3 8 properties and types of ionic compounds

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ion any atom or group of atoms that bears one or more positive or negative electrical charges positively charged ions are called cations negatively charged ions anions

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the ionic strength of a solution is a measure of the concentration of ions in that solution ionic compounds when dissolved in water dissociate into ions the total electrolyte concentration in solution will affect important properties such as the dissociation constant or the solubility of different salts

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figure pageindex 1 ionic solutions when an ionic compound dissociates in water water molecules surround each ion and separate it from the rest of the solid each ion goes its own way in solution all ionic compounds that dissolve behave this way

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here s how that works n acl aq n a aq cl aq sodium chloride dissociates into n a cations and cl anions when dissolved in water notice that 1 mole of n acl will produce 1 mole of n a and 1 mole of cl

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an ion is defined as an atom or molecule that has gained or lost one or more of its valence electrons giving it a net positive or negative electrical charge in other words there is an imbalance in the number of protons positively charged particles and electrons negatively charged particles in a chemical species history and meaning

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you can test for ammonium ions either in a solid or in solution by adding sodium hydroxide solution and warming gently if the compound contains ammonium ions you will get ammonia gas produced which you can test with damp red litmus paper which it turns blue test for cation test for ammonium ion with aqueous sodium hydroxide watch on

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how do you calculate the number of ions in a solution solution calculation of the number of ions in a solution step 1 calculating the number of moles the mole is used as a measurement or a basic unit that helps in calculating the amount of substance present in the given sample

ion pairing a bygone treatment of electrolyte solutions

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attempts to capture the number of free ions in solution which can migrate in the presence of an electric field whereas ion pairs are not thought to contribute to this current this is expressed in terms of molar conductivity l and limiting molar conductivity l 0 according to equation 4 51 a ¼ l l 0 4 activity

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