# Free download Concentration ions solution (Download Only)

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 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 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 it s simple to become an ion since all a neutral atom molecule has to do is gain or lose an electron if one of these airborne ions is breathed in it ll simply transfer its charge to atoms molecules inside our body we create ions and transfer them every day without us noticing 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 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 acids and bases can be described using the arrhenius model acids produce h ions in aqueous solutions while bases produce oh ions we can identify acidic and basic solutions using their distinct and often contrasting properties some of which you are likely familiar with 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 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 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 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 ions migrate under the influence of an electrical field and are the conductors of electric current in electrolytic cells in aqueous solution dissolved ions become hydrated that is a shell of water molecules surrounds them substances that dissolve in water can be categorized according to whether the resulting aqueous solutions conduct electricity each salt ion in solution is surrounded by polar water molecules with the opposite charge to that of the ion turned toward it this electrostatic hydration energy compensates for the loss of attractions between ions in the salt crystal 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 the concentration of the ions can be calculated from the concentration of the salt for this we need to identify how many of each ion appears in one molecule of the salt so for k 2 so 4 there are two k and one so 4 2 ion you can also see this by writing the dissociation equation k 2 so 4 aq 2k aq so 4 2 aq defining solute solvent hydration dissolution precipitation net ionic equation and spectator ions looking at the molecular level interactions between water and ions in nacl created by jay this chapter discusses the kinetics and mechanisms of electron transfer or redox reactions involving ions in solution reactions of aqua metal ions with hydrated electrons are usually very fast with rate constants approaching the diffusion controlled limit one of the main characteristics of a solution with dissolved ions is the ionic strength ionic strength can be molar mol l solution or molal mol kg solvent and to avoid confusion the units should be stated explicitly after calculating the number of moles the number of ions will be equal to the product of the number of moles and avogadro s number number of ions number of moles n a where n a avogadro number hence the number of ions in a solution can be calculated as above using the mole concept as number of ions number of moles n a

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