CHEMISTRY FORM 4 CHAPTER 2 pdf

1: EduMission: Chemistry Form 4: Chapter 2 - Structure of an Atom

Chemistry Chapter 2 form 4 The structure of the Atom Slideshare uses cookies to improve functionality and performance, and to provide you with relevant advertising. If you continue browsing the site, you agree to the use of cookies on this website.

Matter is a general term for the substance of which all physical objects consist. Typically, matter includes atoms and other particles which have mass. A common way of defining matter is as anything that has mass and occupies space. They are packed in an orderly and fixed position. There are empty spaces between particles. Most particles are still in contact with each other. The characteristics of matter can be described using the kinetic theory of matter. The kinetic theory of matter explains the state of matter in solid, liquid and gaseous states based on the following assumptions: Matter is made up of tiny and discrete particles Particles in matter are always vibrating or moving and colliding with each other Particles often move randomly There are forces of attraction between particles of matter. These attraction forces will increase as the distance between the particles become closer The higher the temperature, the higher the kinetic energy of the particle The diffusion of particles in matter supports the kinetic theory of matter 4. Diffusion is a process whereby particles of different matters mix slowly due to the random movement of particles Particles of matter diffuse and mix with other particles 5. The following laboratory activities support the kinetic theory of matter. Laboratory Activity 1 Aim To study the diffusion of particles in gas Material Liquid bromine, Br2 Apparatus Gas jar with glass cover, dropper Procedures 1 2 3 4 A gas jar is placed in a fume chamber Using a dropper, two drops of liquid bromine, Br2, are dropped into the gas jar The gas jar is then immediately covered with a glass cover Changes occurring in the gas jar after several minutes are observed and recorded Observation 1 2 The liquid bromine, Br2, vaporizes to form reddish- brown vapour. The reddish-brown liquid bromine, Br2, vaporizes slowly from the base of the gas jar and fills the whole gas jar. Analysis 1 2 Bromine, Br2, vapour is made of tiny and discrete molecules that move randomly to fill up space and diffuses in all directions in air from areas of higher concentration to areas of lower concentration. Gas diffusion can be defined operationally as the process of random movement of particles in all directions in a gas. Conclusion Bromine, Br2, is made of tiny and discrete particles. Laboratory Activity 2 Aim To study the movement of particles in a liquid Materials Copper II sulphate, CuSO4, crystals, water Apparatus Beaker Procedures 1 2 3 Water is then slowly poured into the beaker Several small pieces of copper II sulphate, CuSO4, crystals are placed in the beaker Changes in the beaker are observed and recorded after two days Observation 1 2 The copper II sulphate, CuSO4, crystals dissolved in the water and turned the solution blue Copper II sulphate, CuSO4, crystals separate into ions when dissolved in water, moving randomly and diffusing in all directions until the whole solution turns blue 3 The diffusion of liquid can be defined operationally as the process of random movement of particles in all directions in a liquid Conclusion Copper II sulphate, CuSO4, is made up of tiny and discrete particles ions. Laboratory Activity 3 Aim To study the diffusion of particles in a solid Materials Potassium manganate VII , KMnO4, crystals, dilute agar hot Apparatus Test tube, rubber stopper, retort stand with clamp Procedures 1 2 3 4 5 Hot liquid agar is poured into a test tube until it is almost full. The agar is then left to cool and solidify. A potassium manganate, KMnO4, crystal is placed on the top of the agar and the test tube is covered with a rubber stopper. The test tube is clamped upside-down. Changes in the test tube within two or three days are observed and recorded. The particles in the potassium manganate VII , KMnO4, crystal will separate to become ions in the agar, move and diffuse randomly upwards until the whole agar turns purple. Diffusion of solid is defined operationally as the random movement of particles in all directions in a solid. It is a neutral particle and takes part in a chemical reaction Examples: All metals and non-metals, such as graphite, diamond, carbon and helium are made up of only one type of atom MOLECULE y y Particles made up of a combination of two or more atoms in certain arrangements through chemical bonds Examples: Almost all non-metal elements such as bromine Br2, naphthalene benzene, C6H6, and water H2O, are made up of molecules ION y y Particles made up of atoms which receive or lose electrons Examples: This is when the heat energy is absorbed or released from the matter. When heat is applied, particles obtain more kinetic energy and move at a faster speed. Summary of changes in heat and states of matter Sublimation heat is released Melting heat is absorbed Sublimation heat is absorbed Freezing heat is released Boiling heat is absorbed Condensation heat is released Laboratory Activity 4 Aim To determine the melting point and the freezing point of naphthalene Materials Naphthalene powder, water Apparatus Boiling tubes, beaker, thermometer, retort stand with clamp, Bunsen burner, tripod stand, wire gauze, stopwatch Procedures 1 a melting point of naphthalene 1 2 3 4 A boiling tube is filled with naphthalene powder to a depth of 3 cm and a thermometer is put into it. The boiling tube is suspended in a beaker half-filled with water using a retort stand and a clamp. The level of naphthalene in the boiling tube is ensured to be below the level of water in the beaker. The water is heated and the naphthalene is stirred slowly with the thermometer. Procedures 1 b freezing point of naphthalene 1 2 The boiling tube in section A is removed from the water bath. The outer surface of the boiling tube is dried and immediately it is put in a conical flask. The naphthalene is stirred continuously. Results 1 Notice that there is a certain part of the curve where there is no change in temperature with time during heating. Notice that there is a certain part of the curve where there is no change in temperature with time during cooling. At this temperature, both solid and liquid are present. It is the melting point of naphthalene. Hence, the melting point of naphthalene is Discussion 1 The heating graph of naphthalene At point A, naphthalene exists as solid. When the solid is heated, heat energy is absorbed. This causes the particles to gain kinetic energy and vibrate faster. The temperature increases from point A to point B. At point B, solid naphthalene begins to melt. During the melting process, the temperature of naphthalene does not rise even though heating continues. The temperature remains constant because the heat energy absorbed by the particles is used to overcome the forces between particles so that the solid can turn into a liquid. At point C, all the solid naphthalene has melted. From point C to point D, the particles in liquid naphthalene absorb heat energy and move faster. The temperature increases from point C to point D. When the liquid is cooled, the particles in the liquid lose their kinetic energy. They move slower as the temperature decreases from point M to point N. At point N, liquid naphthalene begins to freeze. During the freezing process, the temperature of naphthalene remains constant because the heat loss to the surroundings is balanced by the heat energy given off during freezing. At point O, all the liquid naphthalene has frozen. From point O to point P, the particles in solid naphthalene release heat energy and vibrate slower. The temperature decreases from point O to point P. During the heating of naphthalene, a a water bath is used instead of direct heating with a Bunsen flame. This is to ensure that the naphthalene is heated evenly. Furthermore, the naphthalene is flammable. During the cooling of naphthalene, a the boiling tube containing the liquid naphthalene is placed in a conical flask. The air trapped in the conical flask is a poor conductor of heat. This helps to minimize the heat loss to the surroundings which may affect the accuracy of the freezing point obtained. Supercooling is a condition in which the temperature of a cooling liquid drops below its normal freezing point, without the appearance of a solid. Conclusion The temperature of naphthalene increases when the solid is heated and it decreases when liquid naphthalene is cooled down. CONCEPT FOCUS If heating of naphthalene is continued until it boils, the graph that will be obtained is as shown below The temperature does not change at 0C boiling point as the heat is absorbed to overcome the attraction force between molecules particles to release the molecules. This is called latent heat of vaporization. At time m6, liquid naphthalene will boil completely and form naphthalene vapour. At time m5, liquid naphthalene starts to boil. If cooling of naphthalene vapour is performed, the graph that will be obtained is as shown The temperature does not 0 change at C boiling point. This is because the heat lost to the surroundings is equal to the heat released when the molecules attract one another to form liquid naphthalene. Dalton found that compounds always contained the same mass ratio of one element to another This is now known as the Law of Definite Proportions Elements could combine in different ratios, but when they did, they would make different compounds 3- These results could only be explained by assuming that matter was made of atoms tiny building blocks and that these atoms only came in certain sizes. Dalton s view of an atom 4-Besides giving us his Atomic Theory, Dalton did much more in the newly-emerging field of chemistry: He worked with mixtures of gases and determined how the pressure was related to their proportions ii. Cathode rays were produced in the side tube on the left of the apparatus and passed through the anode into the main bell-jar, where they were deflected by a magnet. Thomson detected their path by the fluorescence on a squared screen in the jar. He found that whatever the material of the anode and the gas in the jar, the deflection of the rays was the same, suggesting that the rays were of the same form whatever their origin. Experiment to show that cathode rays were electrically charged Thomson constructed a Crookes tube with an electrometer set to one side, out of the direct path of the cathode rays. Thomson could trace the path of the ray by observing the phosphorescent patch it created where it hit the surface of the tube. Thomson observed that the electrometer registered a charge only when he deflected the cathode ray to it with a magnet. He concluded that the negative charge and the rays were one and the same. Cathode rays were emitted from the cathode C, passed through slits A the anode and B grounded , then through the electric field generated between plates D and E, finally impacting the surface at the far end. The cathode ray blue line was deflected by the electric field yellow. In May-June Thomson investigated whether or not the rays could be deflected by an electric field. Thomson constructed a Crookes tube with a near-perfect vacuum. At the start of the tube was the cathode from which the rays projected. The rays were sharpened to a beam by two metal slits the first of these slits doubled as the anode, the second was connected to the earth. The beam then passed between two parallel aluminium plates, which produced an electric field between them when they were connected to a battery. The end of the tube was a large sphere where the beam would impact on the glass, created a glowing patch. Thomson pasted a scale to the surface of this sphere to measure the deflection of the beam. When the upper plate was connected to the negative pole of the battery and the lower plate to the positive pole, the glowing patch moved downwards, and when the polarity was reversed, the patch moved upwards. Experiment to measure the mass to charge ratio of cathode rays In his classic experiment, Thomson measured the mass-to-charge ratio of the cathode rays by measuring how much they were deflected by a magnetic field and comparing this with the electric deflection. He used the same apparatus as in his previous experiment, but placed the discharge tube between the poles of a large electromagnet. Conclusions As the cathode rays carry a charge of negative electricity, are deflected by an electrostatic force as if they were negatively electrified, and are acted on by a magnetic force in just the way in which this force would act on a negatively electrified body moving along the path of these rays, I can see no escape from the conclusion that they are charges of negative electricity carried by particles of matter. Thomson As to the source of these particles, Thomson believed they emerged from the molecules of gas in the vicinity of the cathode. If, in the very intense electric field in the neighborhood of the cathode, the molecules of the gas are dissociated and are split up, not into the ordinary chemical atoms, but into these primordial atoms, which we shall for brevity call corpuscles; and if these corpuscles are charged with electricity and projected from the cathode by the electric field, they would behave exactly like the cathode rays. This experiment is famously known as Gold-Foil Experiment.

CHEMISTRY FORM 4 CHAPTER 2 pdf

2: Chemistry Form 4 Notes â€“ Chapter 2: Atomic Structure[matter] ~ BLOG [KIMIA] CIKGU IRWAN

Chapter 2: the Structure of the Atom. A) Matter 1. Matter 2 3 Element Compound 4. Atom 5. Molecule 6. Ion 7. Diffusion Is anything that occupies space and has mass.

Let study about Kinetic Theory of Matter. Matter is anything that occupies space and has mass. Matter exists in three states which is solid, liquid and gas. Matter is made up of tiny and discrete particles. An ion is a positively-charged or negatively-charged particle. Particles in matter are in motion. Diffusion occurs when particles of a substance move in between the particles of another subtance. Diffusion of matter occurs most rapidly in gases, slower in liquids and slowest in solids, due to the different arrangement and movement of particles in the three states of matter. The change in heat changes the state of matter. When a substance is heated, the particles gain kinetic energy and move faster. When a substance is cooled, the particles loss their kinetic energy and move slower. Moleculesgroup of two or more atoms held together by chemical bonds. Usually form from covalent bond. Ion An ion is an atom or molecule in which the total number of electrons is not equal to the total number of protons, giving it positive or negative. Usually form from ionic bond. Solid So what is a solid? Solids are usually hard because their molecules have been packed together. The closer your molecules are, the harder you are. Solids also can hold their own shape. A rock will always look like a rock unless something happens to it. The same goes for a diamond. Even when you grind up a solid into a powder, you will see little tiny pieces of that solid under a microscope. Liquids will move and fill up any container. Solids like their shape. In the same way that a solid holds its shape, the atoms inside of a solid are not allowed to move around too much. This is one of the physical characteristics of solids. Atoms and molecules in liquids and gases are bouncing and floating around, free to move where they want. The molecules in a solid are stuck. The atoms still spin and the electrons fly around, but the entire atom will not change position. Liquid The second state of matter we will discuss is a liquid. Solids are hard things you can hold. Gases are floating around you and in bubbles. What is a liquid? Water is a liquid. Your blood is a liquid. Liquids are an in-between state of matter. They can be found in between the solid and gas states. If you have a variety of materials in a liquid, it is called a solution. One characteristic of a liquid is that it will fill up the shape of a container. If you pour some water in a cup, it will fill up the bottom of the cup first and then fill the rest. The water will also take the shape of the cup. It fills the bottom first because of gravity. The top part of a liquid will usually have a flat surface. That flat surface is because of gravity too. Another trait of liquids is that they are difficult to compress. When you compress something, you take a certain amount and force it into a smaller space. Solids are very difficult to compress and gases are very easy. Liquids are in the middle but tend to be difficult. When you compress something, you force the atoms closer together. When pressure go up, substances are compressed. Liquids already have their atoms close together, so they are hard to compress. Many shock absorbers in cars compress liquids in tubes. A special force keeps liquids together. Solids are stuck together and you have to force them apart. Gases bounce everywhere and they try to spread themselves out. Liquids actually want to stick together. There will always be the occasional evaporation where extra energy gets a molecule excited and the molecule leaves the system. Overall, liquids have cohesive sticky forces at work that hold the molecules together. Gas Gas is everywhere. There is something called the atmosphere. Gases are random groups of atoms. In solids, atoms and molecules are compact and close together. Liquids have atoms a little more spread out. However, gases are really spread out and the atoms and molecules are full of energy. They are bouncing around constantly. Gases can fill a container of any size or shape. That is one of their physical characteristics. Think about a balloon. No matter what shape you make the balloon it will be evenly filled with the gas atoms. The atoms and molecules are spread equally throughout the entire balloon. Liquids can only fill the bottom of the container while gases can fill it entirely. You might hear the term vapor. Vapor and gas mean the same thing. The word vapor is used to describe gases that are usually found as liquids. Good examples are water or mercury Hg. Compounds like carbon dioxide are usually gases at room temperature so scientists will rarely talk about carbon dioxide vapor. Water and mercury are liquids at room temperature so they get the vapor title. Gases hold huge amounts of energy, and their molecules are spread out as much as possible. With very little pressure, when compared to liquids and solids, those molecules can be compressed. It happens all of the time. Combinations of pressure and decreasing temperature force gases into tubes that we use every day. The kinetic theory of matter State of Matter.

3: Folio Chemistry Form 4 Chapter 2 - [DOCX Document]

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4: Welcome to Chemistry Blog: Form 4 Revision

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5: AP Chemistry Chapter 2 Review Questions

Starting from the simplest element, hydrogen, and moving through the elements in order we can see how the electrons fill the shells. The the innermost shell (or lowest energy level) of electrons is filled first.

6: Welcome to Chemistry Blog: Sample of Essay Question

All elements are made up of small invisible particles called atoms.; The proton number (also known as the atomic number) of an atom is the number of protons in the nucleus of an atom.

7: PEKA Experiment List for SPM Chemistry Form 4 Chapter 2

Chemistry Form 4: Chapter 6 - Electrolysis of Lead (II) Bromide Electrolysis is a chemical process where a substance in its molten state or in an aqueous solution decomposed by electric current. This inv.

8: ChemQuest â€“ SPM Soalan

7. Diffusion of matter occurs most rapidly in gases, slower in liquids and slowest in solids, due to the different arrangement and movement of particles in the three states of matter.

9: Chemistry Notes

Chapter 4 perodic table 1. Faridahhamat/periodic table/saser CHAPTER 4: PERIODIC TABLE OF ELEMENTS Historical Development Of The Periodic Table Antoine Lavoisier The first scientist to classify substances His classification was unsuccessful because light, heat and a few other compounds were also considered as elements.

CHEMISTRY FORM 4 CHAPTER 2 pdf

Information, randomness incompleteness The short stories News Reporting and Writing 8e Workbook Has Joab Foiled David? Strategic Defense Initiative, folly or future? Alaska National Interest Lands American Indian Stories (Second Edition) Slower Traffic Keep Left Names of jesus list So Incredibly Idaho! Michigan Zoos and Animal Parks (Glovebox Guidebook) Tripping over skyscrapers Esther Guimond Le Lion, la Paysanne (d. 1879) Light management in controlled environments Torts, egalitarianism, and distributive justice Nights 1-3. The The The The Nights 3-9. The The The The The Nights 9-18. The The The The The The The Nigh Smp Book E Transparencies Gopro hero 4 silver manual portugues Morgan Spirit (Spirit of the Horse) My big book of everything MIL Rainy Day Records Healthcare quality handbook 29th edition Audiopipe apmi 1300 amplifier manual Geographical Boundaries of British India The patient speaks of her mother Stewards of Access Custodians of Choice Nursing history in the undergraduate curriculum Patricia Donahue Orange county police officer cafeteria plan Swiss sound box book New hope for the dead Advent/Christmas Clip Art: With the Indians in the Lumber Woods Counselling Children Process your thoughts Business and management ib History of textile art Beacons of Light (Kinkade, Thomas) Psychology in India Revisited Developments in the Discipline, Volume 3 Scout Hits the Trail (Pet Tales) Metamorphic Phase Equilibria and Pressure-Temperature-Time Paths (Monograph (Mineralogical Society of Ame