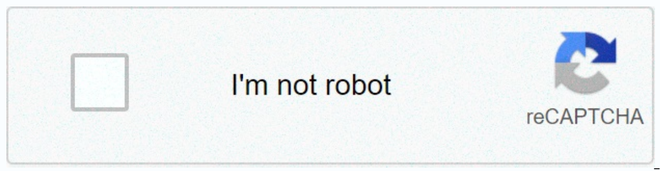

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Decomposition of calcium carbonate lab answers

Calcium carbonate is highly heated until it undergoes thermal decomposition to form calcium oxide and carbon dioxide. Calcium oxide (unsalted lime) is dissolved in water to form calcium hydroxide (lime water). Carbon dioxide boiling through that forms a milky suspension of calcium carbonateCeles experiment can be performed conveniently in groups of two or three and takes about 40-45 minutes. Equipment Equipment Eye Protection Trepied Gaze Bunsen Burner Tongs Boiling Tubes, x2 (note 1) Drinking Straw (note 2) Loping pipette Funnel filter, small filter paper device notes Use large (150 x 25 mm) test tubes (boiling tubes). Freshly purchased drinking straws should be used and each student has received their own straw. Chemicals Universal Calcium Carbonate Indicator Solution (FLAMMABLE ETE) Health, Safety and Technical Notes Read our standard health and safety guidelines. Wear eye protection. Calcium Carbonate, CaCO3(s) - see CLEAPSS Hazcard HC019b. The calcium carbonate used should take the form of pieces of chalk the size of a pea. Blackboard chalk should not be used as it is likely to be primarily calcium sulphate. Universal Indicator Solution (FLAMMABLE HIGH) - see CLEAPSS Hazcard HC032 and CLEAPSS Recipe Book RB047. Procedure You need to prepare a tabulated results sheet before you start your experiments. An example table is provided below in the teaching notes. Place a piece of chalk (calcium carbonate) on a gauze. If your gauze has a coated central circle, use the edge where there is no coating. Heat the chalk very strongly for 5 to 10 minutes. Write down what you're watching. Allow the chalk to cool and use tongs to move it into a boiling tube. Add 2 to 3 drops of water with a pipette. Note your observations. Add about 10 cm3 more water to the solid. What's going on now? Strain half of the mixture into the other boiling tube and, using a straw, gently blow a stream of bubbles through the filtrate. What do you see? Test the remaining half of the mixture with the Universal Indicator solution. Write down what you're watching. Teaching Notes Keep an eye on less mature students who might be tempted to suck rather than blow through the filtrate. Expected results are: Method Observation Heat for 10 minutes Chalk should be seen to collapse slightly Add 2-3 drops of water More in ruins, given steam, proof that the mixture has become hot Add 10 cm3 more water Some of the solid dissolved, the white suspension Blowing bubble to Limewater solution becomes cloudy Add universal indicator ranges from green to blue/purple This set of experiments involves a variety of important reactions and types of reactions, with several references to industrial processes. The roasting of limestone and the hydration of the formed white lime has relevance in the manufacture of plaster and cement, and in laboratory lime water is a common common carbon dioxide testing. Students could be asked to conduct web searches on these applications. A few questions and answers for the class after the experience Why does chalk crumble slightly on a high heating? Carbon dioxide/gas is evolved; it forces its way out of the solid and breaks down its structure. What type of reaction occurs during the heating process? Write an equation for the reaction. Thermal decomposition; CaCO3(s) → CaO(s) - CO2(g) Why does steam change when water drops are added? Write an equation for the reaction that occurs. The reaction is very exothermic and the small amount of water added is partly converted to steam in the process: CaO(s) - H2O(l) → Ca(OH)2)s) Why does lime water become cloudy? Write an equation for the reaction that occurs. Insoluble calcium carbonate is precipitated: Ca(OH)2(aq) - CO2(g) → CaCO3(s) - H2O(l) What does the color change that occurs when lime water is added tell you about the pH of the solution? Explain why you would expect pH to have this value. The pH is about 11 - 14; soluble metal hydroxsides are alkaline and therefore give high pH values. Nuffield FoundationThis is an experience of the practical chemistry project, developed by the Nuffield Foundation and the Royal Society of Chemistry. Atoms are rearranged during chemical reactions, and are not lost or won. Chemical reactions can be represented using equations. Catalysts speed up reactions without being used. Big Idea 4, Investigation 10, Primary Learning Objective 4.1What factors determine the rate at which a chemical reaction will occur? The answer has applications not only in chemistry, but also food science, engineering, and even art and architecture. Consider the weather of beautiful marble statues from antiquity! In this advanced survey laboratory, students learn how reaction rates are measured and how concentration affects the rate of a reaction as they design kinetic experiments for the heterogeneous response of calcium carbonate with hydrochloric acid. The survey begins with an introductory activity in which students observe and measure the gradual evolution of carbon dioxide from the decomposition of calcium carbonate with acid. Special equipment is provided for this purpose. The procedure provides a model for guided-survey design of kinetic experiments to determine the rate of reaction with different acid concentrations. Using a cooperative approach in the classroom, students compare data from measures of mass loss and the volume of compared to time. Students also use graphic analysis to determine initial reaction rates. Other factors, such as the effect of particle size in a heterogeneous reaction, offer opportunities for further investigation. The laboratory fulfills the main learning objectives related to experimental measurements and the interpretation of results determinations of the rate law. Comparing the results of two approaches strengthens scientific practice skills for evaluating data sources. Complete for 24 students working in pairs. Common laboratory equipment is required and available separately. Materials included in the kit: Calcium Carbonate (marble shavings), 70 g hydrochlorinated acid solution, 1 M, 500 mL Hydrochlorinated acid solution, 2 M, 500 mL Hydrochlorinated acid solution, 6 M, 500 mLStopcock, 6Stopper, black rubber, 1 hole, #5 size, 6Syringe extender, 6Syringe, disposable, 140 mL Related topics: More lessons for IGCSE Chemistry Math Spreadsheets A series of free IGCSE chemistry activities and experiments (Cambridge IGCSE Chemistry). Limestone is a common rock that is a very useful material. For example, it is used for the construction and manufacture of roads, and also as a starting material for the manufacture of many other products. This activity illustrates some of the chemistry of limestone (calcium carbonate) and other materials made from it. Calcium carbonate is heated heavily until it undergoes thermal decomposition to form calcium oxide and carbon dioxide. Calcium oxide (unsalted lime) is dissolved in water to form calcium hydroxide (lime water). Carbon dioxide bubbling through this forms a milky suspension of calcium carbonate. The following diagram shows the limestone cycle: calcium carbonate, calcium oxide, calcium hydroxide. Scroll down for limestone cycle demonstration activities. Method: 1. Prepare a tabulated result sheet before starting experiments. 2. Place a piece of calcium carbonate (limestone) on a gauze. 3. Heat the limestone very strongly for 5 to 10 minutes. Write down what you're watching. (If possible, darken the room and note what happens when the flame is driven directly onto the lumps. It may be possible to see lumps shining - this is the origin of the term projector. Limelight was once used to illuminate theatre performances.) 4. Allow lumps to cool and use tongs to move them through a boiling tube. Add 2 to 3 drops of water with a pipette. Note your observations. 5. Add about 10 cm3 more water to the solid. What's going on now? 6. Strain half of the mixture into the other boiling tube and, using a drinking straw, gently blow a stream of bubbles through the filtrate. What do you see? 7. Test the remaining half of the mixture with the Universal Indicator solution. Write down what you're watching. Questions 1 Why does chalk crumble slightly on high heating? 2 What type of reaction takes place during the heating? Write an equation for the reaction. 3 Why does steam change when water drops are added? Write an equation for the reaction that occurs. 4 Why does lime water become murky? Write an equation for the reaction that occurs. 5 What is the color change when the universal indicator is added? What does this tell you about the pH of the solution? Explain why the pH would be to have that value. Solutions Show Solutions 1. The heat caused the rupture of the chalk structure and the evolution of carbon dioxide/gas. 2. Thermal decomposition. CaCO3(s) → CaO(s) - CO3(g) 3. The reaction is very exothermic, and the added water drops are partly converted to steam. CaO(s) - H2O(l) → Ca (OH)2(s) 4. Insoluble calcium carbonate is precipitated. Ca (OH)2 (aq) - CO2O(g) → CaCO3(s) - H2O(l) 5. The color ranges from green to blue indicating that the solution is alkaline and that the pH is about 11-14. The soluble metallic hydroxsides are alkaline and will give high pH values. Try the free mathway calculator and problem solver below to practice various math subjects. Try the examples given, or type your own problem and check your answer with the explanations step by step. We welcome your comments, comments and questions on this site or page. Please submit your comments or enquiries via our Comments page. Page.