Basic titrating skills and techniques in order to titrate hcl

Science, Chemistry

Introduction\n\nIn this lab we will use basic titrating skills and techniques in order to titrate HCl. We will also be practicing how to prepare the solution. Using the titration data, we can practice our stoichiometric skills and also become more familiar with using lab equipment. Titration is the process of measuring the exact volume of a solution of known concentration that is required to react completely with a measured volume of a solution of unknown concentration or a known mass of unknown solid. A solution of accurately known concentration is called a standard solution. To be considered standard, the concentration of the solute in the solution must be known to four significant figures.\n\nWhen an acid or base solution is prepared from stock acid or base, the concentration is approximately known. However, due to relative purity and limitations on the accuracy and precision of measuring quantities for solution preparation, the solution’s exact concentration is not known. For this reason, the process of standardization is used. Standardization is a laboratory process in which the exact concentration of a solution is obtained by comparing the concentration of the solution to a primary standard, a dry substance of known purity. Procedure Part A - Preparation of 0. 1 M HC1 Solution\n\n1. Prepare 250m1 0. 1 M HCl solution from the 6 M stock solution provided. Calculation: (6 M) (? ml) = (0. 1 M) (250 ml)\n\n2. Prepare the solution by adding approximately l00ml distilled water to the 250 ml volumetric flask, pipetting the calculated volume of stock 6 M HC1 solution into the flask, and diluting to the mark with distilled water. Apply parafilm to the flask top and invert and shake to assure mixing. Part B - Standardization of HC1 Solution 1. Clean and Dry three 125ml Erlenmeyer flasks.\n\n2. Mass three portions of Na2CO3 between . 2

and . 25 g and record the masses to three decimal places and identl1 each flask (ie.; . 241 g). 3. In each flask, dissolve the dry solid with approximately 25 ml of distilled water. Add three drops of methyl purple indicator to each flask. Note: remember to clean buret as discussed and use 2-3 ml titrant as final rinse. 4. Titrate each sample as discussed in the introduction to the laboratory. Be careful to add titrant slowly and mix well as you titrate. Do not over-shoot the endpoint. Note that there will be a change to gray color before the final endpoint of violet.\n\n5. Record the initial and final buret readings on the data sheet. 6. Repeat this process for all three samples. 7. Calculate the concentration of the standardized acid solution from the reaction as shown below. 8. Determine the average concentration of the HC1 solution. 9. Determine the relative precision of your results. Standard Deviation Step 1 = Compute the average of the three values. Step 2 = Subtract each individual value from the average. Step 3 = Sum the square of the deviations in step two. Step 4 = Divide step three by n (the number of observations). Step 5 = The square root of this value is standard deviation.\n\nData Standard Deviation Step 1 = Step 2 = Step 3 = Step 4 = Step 5 = Conclusion An acid-base titration is the determination of the concentration of an acid or base by exactly neutralizing the acid or base with an acid or base of known concentration. This allows for quantitative analysis of the concentration of an unknown acid or base solution. It makes use of the neutralization reaction that occurs between acids and bases and the knowledge of how acids and bases will react if their formulas are known. Acid —base titrations can also be used to find percent purity of chemicals.