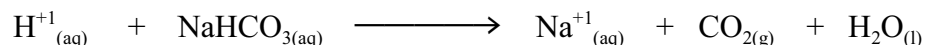


Lab: How Much Fizz Does an Alka - Seltzer Tablet Produce?

Introduction

An Alka - Seltzer tablet contains hydrogen carbonate, citric acid, and an analgesic (painkiller). When water is added, the hydrogen ions from the citric acid react with the hydrogen carbonate ion as follows:



If you measure the volume of carbon dioxide formed, you can find the percentage of sodium hydrogen carbonate in a tablet.

Materials

one unbroken Alka-Seltzer tablet, 1-L beaker, 100 cm³ graduated cylinder, balance, thermometer, barometer, table of vapour pressures for water.

Procedure

1. Fill a 100 cm³ graduated cylinder with water, cover the mouth with a stopper, (or with the palm of your hand), and then invert it into a 1 dm³ beaker containing about 700 cm³ of water.
2. Open an Alka-Seltzer packet, and determine the mass of an unbroken tablet.
3. Lift the graduated cylinder until the rim is just under the surface.
4. Quickly place the tablet under the mouth of the graduated cylinder, keeping your fingers across the mouth to prevent the tablet from escaping.
5. When no more gas is formed, lift the cylinder until the water levels inside and out are the same(if this is possible). Then read the volume of gas produced.
6. Record the water temperature and laboratory pressure.

Data Processing and Presentation

1. Record all your data in a suitable table.
2. Using a table of vapour pressures for water, calculate the pressure due to the carbon dioxide.
3. From the volume, pressure, and temperature of carbon dioxide, calculate the number of moles of carbon dioxide produced.
4. Using the number of moles of CO_{2(g)} and the balanced chemical equation, calculate the mass of sodium hydrogen carbonate in the tablet.
5. From the mass of sodium hydrogen carbonate and also knowing the total mass of the tablet, calculate the percent of sodium hydrogen carbonate in the tablet.

Data Evaluation and Conclusion

1. Discuss the major sources of error incurred in this lab, and how these errors affected your result.
2. Suggest how the experiment could be improved.
3. Discuss the advantages and the disadvantages of such a tablet over an analgesic tablet or caplet.
4. Suggest why citric acid is used rather than any other acid.
5. Research why a mixture of helium and oxygen gas, rather than oxygen and nitrogen, is used for deep-sea divers. Summarize your findings in a paragraph.
6. Dinitrogen oxide, N₂O, is only one of a number of chemicals that can be used as an anaesthetic. Research to find out what other compounds are used for this purpose. Summarize your findings in a paragraph, and explain the properties that a good anesthetic must possess.
7. Write a conclusion to the lab.

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