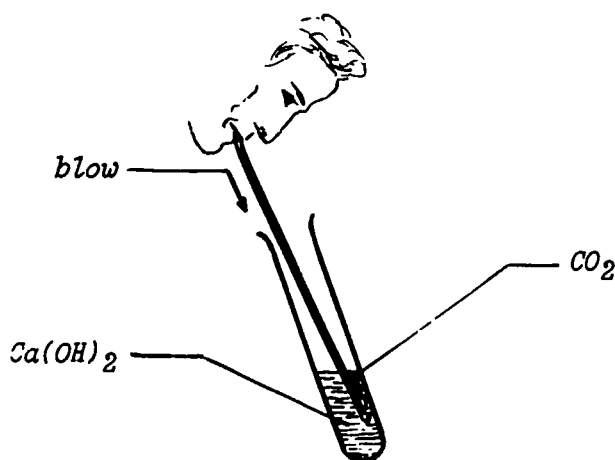


5.14. THE DISAPPEARING PRECIPITATE

- Materials:
1. Calcium hydroxide solution --  $\text{Ca}(\text{OH})_2$ .
  2. A wide test tube & a drinking straw.

Procedure:

1. Fill the test tube about one-third with calcium hydroxide solution. If in powder form, make a saturated solution by dissolving some in warm water and filtering excess powder; use filtrate.
2. Blow through the straw into the calcium hydroxide solution until a precipitate is formed (cloudy solution).
3. Now continue blowing into the cloudy liquid until the liquid clears up again: the cloud is blown away!

Questions:

1. What is the reaction that forms the precipitate?
2. In general, why and when is a precipitate formed?
3. What made the formed precipitate disappear?
4. When is a precipitate or solid powder in a liquid invisible?
5. Can you name other precipitous reactions?

Explanation:

By blowing into the solution, we were adding carbon dioxide gas to it. The reaction is as follows:  $\text{CO}_2 + \text{Ca}(\text{OH})_2 = \text{CaCO}_3 + \text{H}_2\text{O}$ , where the calcium carbonate formed is the precipitate. Although this precipitate is in the form of a milky or cloudy substance, it is still a deposit of solid material. This is apparent when the blowing is ended at this stage and the test tube left standing for a while. A precipitate will then collect at the bottom of the test tube.

By continuing the blowing, more carbon dioxide is added to the precipitate, resulting in the reaction:  $\text{CaCO}_3 + \text{H}_2\text{O} + \text{CO}_2 = \text{Ca}(\text{HCO}_3)_2$ , which is calcium bicarbonate, and this substance is soluble in water.

In general, a precipitate is formed when the compound formed has a low solubility in water. When this solubility is increased, either by raising the temperature or by changing the compound itself, it goes back into solution and becomes invisible (clear liquid).