2.5: pH measurement

The pH is usually measured in laboratories by a digital pH meter. The electrode of the pH meter is first calibrated with solutions of know pH values, and then the electrode is dipped in the test solution to read its pH value.

pH papers are a cheaper alternative often used for pH measurement in qualitative analyses of cations that gives quick results, as illustrated in Figure 2.5.1.

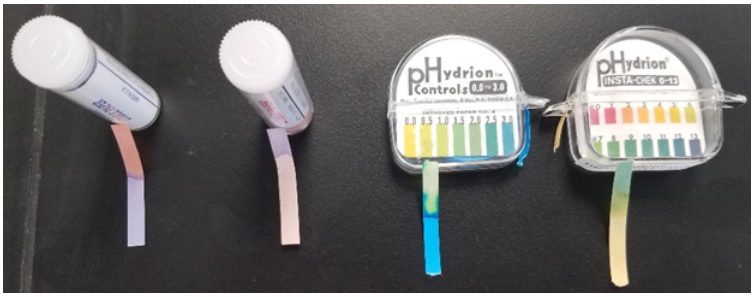

Figure 2.5.1: Illustration of pH measurements, from left to right: i) blue litmus paper turned red a the top end by an alkaline solution, ii) red litmus paper turned blue at the top end by an alkaline solution, iii) short-range pH paper testing a solution of pH ~0.5, and iv) full range pH paper testing a solution at pH ~8.

Using a pH paper

If the purpose is to monitor when the solution turns from acidic to alkaline or vice versa, a litmus paper is used. A red litmus paper stays red in an acidic solution and turns blue in a basic solution. A blue litmus paper turns red in acidic and stays blue in a basic solution.

If the purpose is to determine an approximate pH value, a universal pH indicator paper is used. The test solution is applied to the end of a pH paper strip with a glass rod and the pH is read by matching the color of the test paper socked in the test solution with the color chart on the pH paper box.

Caution

A common mistake is dipping a pH paper in the test solution and withdrawing immediately to read the color change. It should be avoided as it may leave contaminants in the solution. Further, the test solution is at the bottom of the test tube requiring a long paper strip and making it difficult to avoid touching the sides of the test tube above the liquid. A better approach is to cut a piece of pH paper about 2 cm long and touch one end with a wet glass rod that was used to stir the test solution and then read the color change in the pH paper by matching it to the color on the chart.