

Experiment 9

pH of Salts

This experiment is performed in pairs.

Objectives:

1. To recognize that salt solutions may have a non-neutral pH.
2. To estimate the pH of five salt solutions using indicators.
3. To determine the pH of five salt solutions using a pH probe.
4. To write chemical equations to support the observed pH of salt solutions.

Introduction:

A “salt” is simply another name for an ionic compound. When an ionic compound dissolves in water it dissociates into its ions. The resultant aqueous ions can act as acids or bases, or can be neutral.

In general, anions will form basic or neutral solutions, while cations will form acidic or neutral solutions¹. The overall pH of the salt solution will be determined by both ions. For example, if the cation is neutral and the anion is basic, then the pH of the salt solution is basic. If both cation and anion are neutral, the salt solution will be neutral.

In this experiment, you will learn how to estimate (using the colours of indicators²) and measure (with a pH probe) the pH of various aqueous salt solutions. Once you determine whether the salt solution is acidic, basic or neutral, you will be asked to explain this behaviour and support your explanation with the relevant chemical equation.

Figure 1 and Table 1 provide some information relevant to this experiment. (Figure 1 is also posted on the Chemistry Department page of the John Abbott Website under Supplemental Information in colour.)

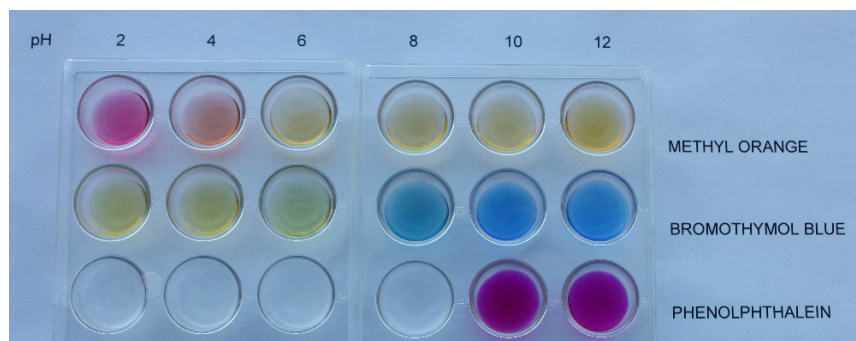


Figure 1. Colours of indicators in solutions of various pH values

¹ Try to reason out why this would be. *Hint:* look for conjugate acid/base pairs.

² Indicators are weak acids themselves. Their unusual (and useful) property is that the weak acid and its conjugate base are different colours.