

# pH Properties of Buffer Solutions

## Flinn AP Chemistry Laboratory #19

### Introduction

One of the most important applications of acids and bases in chemistry and biology is that of buffers. A buffer solution resists rapid changes in pH when acids and bases are added to it. Every living cell contains natural buffer systems to maintain the constant pH needed for proper cell function. Many consumer products are also buffered to safeguard their activity. What are buffers made of? How do buffers maintain the delicate pH balance needed for life and health?

### Concepts

- Buffers
- Weak acid-weak base
- Conjugate acid-base pairs
- Dissociation constant
- Ideal buffer
- Background

The ability of buffers to resist changes in pH when acid or base is added is a result of their chemical composition. All buffers contain a mixture of a conjugate acid-base pair; either a weak acid (HA) and its conjugate base (A<sup>-</sup>), or a weak base (B), and its conjugate acid (BH<sup>+</sup>). Weak acids and bases both dissociate slightly in water (Reactions 1 and 2).



*weak acid* *conjugate base*



*weak base* *conjugate acid*

These reactions are reversible and both the weak acid and its conjugate base or the weak base and its conjugate acid are present in solution.

The equilibrium constant expression for these dissociation reactions are:

$$K_a = [\text{H}_3\text{O}^+][\text{A}^-]/[\text{HA}] \quad \text{Equation 1}$$

$$K_b = [\text{OH}^-][\text{BH}^+]/[\text{B}] \quad \text{Equation 2}$$

Buffers control pH because the two buffering compounds, either HA and A<sup>-</sup> or B and BH<sup>+</sup>, are able to neutralize both acids and bases added to the solution.



# Properties Of Buffer Solutions Lab 16

**R Barnett**



## **Properties Of Buffer Solutions Lab 16:**

## **Properties Of Buffer Solutions Lab 16** Book Review: Unveiling the Magic of Language

In a digital era where connections and knowledge reign supreme, the enchanting power of language has become more apparent than ever. Its capability to stir emotions, provoke thought, and instigate transformation is really remarkable. This extraordinary book, aptly titled "**Properties Of Buffer Solutions Lab 16**," compiled by a highly acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound impact on our existence. Throughout this critique, we shall delve into the book's central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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