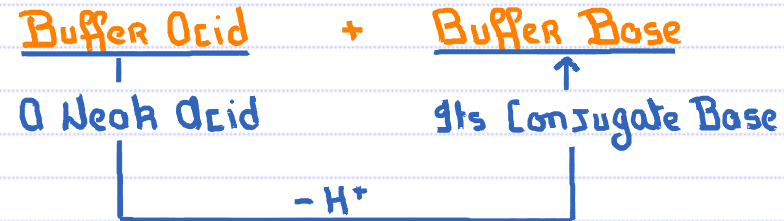


## 17.2

## Buffers

### How do they Resist Drastic pH Change – A Summary

1. BUFFER :



2. How does a buffer resist drastic pH changes when it comes in contact with  $H_3O^+$  or  $OH^-$



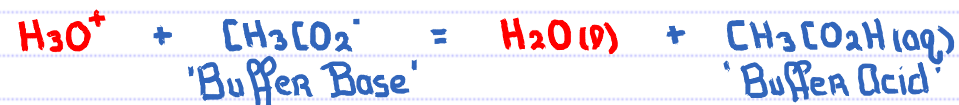
## 17.2

## Buffers

How do they Resist Drastic pH Change

Buffer: 1M  $\text{CH}_3\text{CO}_2\text{H}$  / 1M  $\text{CH}_3\text{CO}_2^-$   
Addition of Strong Acid –  $\text{H}_3\text{O}^+$

$\text{CH}_3\text{CO}_2\text{H}$  /  $\text{CH}_3\text{CO}_2^-$   
Weak Acid / Conjugate Base  
'Buffer Acid' / 'Buffer Base'



### OVERALL CHANGES:

$[\text{CH}_3\text{CO}_2^-]$ : ↓ ... Reacts with the added  $\text{H}_3\text{O}^+$

$[\text{CH}_3\text{CO}_2\text{H}]$ : ↑ ... Product of the reaction that removes the  $\text{H}_3\text{O}^+$

$[\text{H}_3\text{O}^+]$ : ↑ ... Slight increase ... the result of the ['Buffer Acid'] ↑

pH: ↓ ... from the slight increase in  $[\text{H}_3\text{O}^+]$

## 17.2

### Buffers

How do they Resist Drastic pH Change

Buffer: 1M  $\text{CH}_3\text{CO}_2\text{H}$  / 1M  $\text{CH}_3\text{CO}_2^-$   
Addition of Strong Base –  $\text{OH}^-$

$\text{CH}_3\text{CO}_2\text{H}$  /  $\text{CH}_3\text{CO}_2^-$   
Weak Acid / Conjugate Base  
'Buffer Acid' / 'Buffer Base'



#### OVERALL CHANGES

$[\text{CH}_3\text{CO}_2\text{H}]$  : ↓ ... Reacts with the added  $\text{OH}^-$ .

$[\text{CH}_3\text{CO}_2^-]$  : ↑ ... Product of the reaction that removed  $\text{OH}^-$

$[\text{OH}^-]$  : ↑ ... Slight increase ... a result of the [Buffer Base] ↑

pH : ↑ ... From the slight increase in  $[\text{OH}^-]$



## 17.2 Buffers

### Identifying Buffers

Which of the following aqueous solutions are good buffer systems?

- 0.34 M ammonium bromide + 0.36 M ammonia  
 $\text{NH}_4^+$   $\text{NH}_3$
- 0.22 M nitric acid + 0.16 M potassium nitrate  
 Strong acid
- 0.32 M nitrous acid + 0.21 M potassium nitrite  
 $\text{HNO}_2$   $\text{NO}_2^-$
- 0.18 M barium hydroxide + 0.21 M barium bromide  
 Strong base
- 0.14 M hydrofluoric acid + 0.20 M sodium fluoride  
 $\text{HF}$   $\text{F}^-$

2 To Look Out For:

1.) Strong Acid + Weak Base	} When the concentration of the Strong is < concentration of the Weak.
2.) Weak Acid + Strong Base	

