Acids and Bases

Recall: The product of the $\left[H_3O^+\right]\left[OH^-\right] = 1.0\times10^{-14} = K_w$

The *ion- product constant* for water.

To simplify this notation we often write H_3O^+ as H^+.

$$\left[\quad\right]\left[\quad\right] = 1.0\times10^{-14} = K_w$$

$$\left[H^+\right]\left[OH^-\right] = 1.0\times10^{-14}$$

$$-\log\left(\left[H^+\right]\left[OH^-\right]\right) = -\log\left[1.0\times10^{-14}\right]$$

$$\left(-\log\left[H^+\right]\right) + \left(-\log\left[OH^-\right]\right) = -\left[\qquad\qquad\right]$$

$$+ \qquad\qquad = \qquad\qquad$$

Therefore, the sum of *pH* and *pOH* is 14.00.

The "*p* scale" is based on common logarithms (base 10 logs).

The symbol *p* means – log .

$$\left[H^+\right] = 4.3\times10^{-9}\ M$$

$$\left[OH^-\right] = \frac{1.0\times10^{-14}}{\left[\quad\right]}$$

$$\left[OH^-\right] = \frac{1.0\times10^{-14}}{\quad}$$

$$\left[OH^-\right] =$$

Note: $\dfrac{\left[H^+\right]\left[OH^-\right]}{\left[\quad\right]} = \dfrac{1.0\times10^{-14}}{\left[\quad\right]}$

$$\left[OH^-\right] = \frac{\quad}{\quad}$$

$$\left[H^+\right] = 4.3\times10^{-9}\ M = 0.0000000043\ M$$

$$\left[OH^-\right] = 2.3\times10^{-6}\ M = 0.0000023\ M$$

$$pH = -\log\left[\quad\right] = -\log(\quad) =$$

$$pOH = -\log\left[\quad\right] = -\log(\quad) =$$

$$pH + pOH = 14.00$$

$$pOH = 14.00 -$$

$$= 14.00 -$$

$$=$$

$$pOH = 9.42$$

$$pH + pOH = 14.00$$

$$pH = 14.00 -$$

$$pH =$$

$$pH = -\log\left[H^+\right]$$

$$-pH = \log\left[\quad\right] \xrightarrow[\text{Form}]{\text{Exponential}} 10^{\quad} = \left[\quad\right]$$

$$10^{\quad} = \left[\quad\right]$$

$$2.6\times10^{-5}\ M = \left[\quad\right]$$

$$\left[H^+\right] = 2.6\times10^{-5}\ M$$

$$\left[OH^-\right] = \frac{1.0\times10^{-14}}{\left[\quad\right]}$$

$$\left[OH^-\right] = \text{————————}$$

$$\left[OH^-\right] =$$

$$pOH = -\log\left[OH^-\right]$$

$$-pOH = \log\left[\quad\right] \longrightarrow 10^{-pOH} = \left[\quad\right]$$

$$10^{-9.42} = \left[\quad\right]$$

$$3.8\times10^{-10}\ M = \left[\quad\right]$$

Exponential Form