

## Answer on Question #76550 - Chemistry - General Chemistry

### Question:

A solution is tested with a pH meter and a pH of 3.95 is recorded. Calculate the  $[H_3O^+]$  and the  $[OH^-]$  for this solution

### Solution:

The common equation is:

$$pH + pOH = 14$$

$$pH = 3.95$$

$$pOH = 14 - 3.95 = 10.05$$

To get the value of  $[OH^-]$  we have to use our knowledge that pOH is a negative logarithm of  $[OH^-]$ :

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

$$[OH^-] = 10^{-pOH}$$

$$[OH^-] = 10^{-10.05} = 8.9 \cdot 10^{-11}$$

The equilibrium constant of water is equal to:

$$K_w = [H_3O^+][OH^-] = 1 \cdot 10^{-14}$$

By this way equilibrium concentration of  $[H_3O^+]$  will be:

$$[H_3O^+] = \frac{K_w}{[OH^-]} = \frac{1 \cdot 10^{-14}}{8.9 \cdot 10^{-11}} = 1.1 \cdot 10^{-4}$$

### Answer:

The concentrations of  $[H_3O^+]$  and  $[OH^-]$  for solution are  $1.1 \cdot 10^{-4}$  and  $8.9 \cdot 10^{-11}$  respectively.