Answer on Question #42131 - Chemistry - Inorganic Chemistry

Question

In a solution at 25°C, the $[H^+]$ is 3.5×10^{-6} M. What is the $[OH^-]$?

Answer:

Water itself is a weak acid and a weak base. It dissociates according to the equilibrium:

$$2H_2O \leftrightarrow H_3O^+_{(aq)} + OH^-_{(aq)}$$

with a dissociation constant, K_W defined as

$$K_W = [H^+][OH^-],$$

where $[H^+]$ stands for the concentration of the aquated hydronium ion and $[OH^-]$ represents the concentration of the hydroxide ion. K_W has a value of about 10^{-14} at 25 °C.

Therefore the concentration of hydroxide ions in the solution equals:

$$[OH^-] = \frac{K_W}{[H^+]} = \frac{10^{-14}}{3.5 \times 10^{-6}} = 2.86 \times 10^{-9}\ M$$

Answer: $[OH^-] = 2.86 \times 10^{-9}$ M.