Answer on Question#63351 – Chemistry – General chemistry

Question: Concentrated aqueous $HClO_4$ has a concentration of 14.8 M. Calculate the concentrations of all ions present in a solution prepared by pipetting 4.59 mL of concentrated HClO4 into a 1000. mL volumetric flask and filling to the mark.

Hydronium ion concentration?

M

Perchlorate ion concentration?

M

Solution:

n($HClO_4$) = $4.59 \times 10^{-3} L \times 14.8 \frac{mol}{L}$ = 0.068 mol

C($HClO_4$) =$\frac{0.068\ mol}{1000\ ml} = \frac{0.068\ mol}{1L}$=0.068 M

$HClO_4 + H_2O = H_3O^+ + ClO_4^-$ (Hydronium ion is H_3O^+; Perchlorate ion is ClO_4^-)

$HClO_4$ is a strong acid that completely dissociates in aq solution, so:

$[ClO_4^-] = [H_3O^+] = C(HClO_4) = 0.068$ M

Answer:

0.068 M Hydronium ion

0.068 M Perchlorate ion