Answer on Question#54859 - Chemistry - Physical Chemistry

Question:
How many moles of HCl must be removed from 1 litre of aqueous HCl solution to change it's pH from 2 to 3?

Solution

Dissociation equation of HCl in solution:

$$HCl \rightleftharpoons H^- + Cl^-$$

HCl is the strong acid and dissociate completely in aqueous solution so $[H^+]=[HCl]$.

Than $pH=-\log_{10}[HCl]$; $[HCl]=10^{-pH}$
If pH=2, $[HCl]_1=10^{-2}$ (mol/L) and if pH=3, $[HCl]_2=10^{-3}$ (mol/L)
It should be removed $[HCl]_1 - [HCl]_2 = 10^{-2} - 10^{-3} = 0.009$ (mol) from 1 litre of aqueous HCl

Answer: 0.009 moles