

pH of a buffer solution

Introduction: The pH of a buffer solution can be calculated, once the concentrations of the components are known.

Buffer Calculations

What is its pH after the addition of 10cm^3 of 1.0mol dm^{-3} HCl (aq) to 1dm^3 of the solution?

$$\begin{aligned} [\text{CH}_3\text{COOH}] &= \frac{0.11}{1010} \\ [\text{CH}_3\text{COO}^-] &= \frac{0.09}{1010} \end{aligned}$$

The volume is now 1dm^3 for the original volume plus the 10cm^3 for the HCl added

$$\text{pH} = \text{pK}_a + \text{p} \frac{[\text{HA}]}{[\text{A}^-]}$$

but in fact the volumes cancel in this equation

$$\begin{aligned} &= 4.75 - \log \frac{(0.11 / 1010)}{(0.09 / 1010)} \\ &= \underline{\underline{4.66}} \end{aligned}$$

The pH has gone down from 4.75 to 4.66.
The buffer has resisted change in pH on addition of a small amount of acid.

https://www.youtube.com/watch?v=7Us44X98r-E&feature=emb_logo

<https://prezi.com/p78j1pi5jqw3/acids-bases-ph-buffers/>

<https://quizlet.com/117488570/ph-calculations-buffers-flash-cards/>