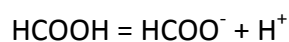
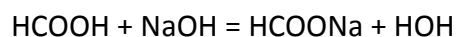


Question #7, Chemistry / / Completed

0.1M Formic Acid solution is titrated against 0.1 M NaOH solution. What would be the difference in pH between 1/5 and 4/5 stages of neutralization of acid?

Solution



$$\text{pH} = -\lg [\text{H}^+]$$

$$K = 1.77 \times 10^{-4} \text{ for formic acid}$$

For 0.1 M HCOOH:

$$K = [\text{H}^+] \times [\text{HCOO}^-] / [\text{HCOOH}]$$

$$[\text{H}^+] = [\text{HCOO}^-] = \sqrt{K \times [\text{HCOOH}]} = 4.207 \times 10^{-3} \text{ mol/L}; \text{pH} = 2.376$$

For 1/5 stage:

$$4.207 \times 10^{-3} - 1/5 \cdot 4.207 \times 10^{-3} = 0.0033656 \text{ mol/L}; \text{pH} = 2.473$$

For 4/5 stage:

$$4.207 \times 10^{-3} - 4/5 \cdot 4.207 \times 10^{-3} = 0.0008414 \text{ mol/L}; \text{pH} = 3.075$$

$$\Delta = 3.075 - 2.473 = 0.602 \approx 0.6$$

Answer: 0.6.