

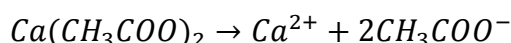
Answer on the Question #65207, Chemistry / General chemistry

Consider a solution prepared by dissolving 1.1 g of calcium formate salt in .75 L of water. (Assume complete solubility of the salt in water).

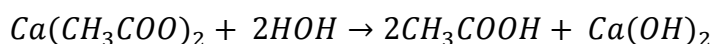
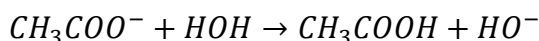
- Write and balance the reaction according to which the salt dissociates in water
- briefly explain which ions will hydrolyze. Write and balance any appropriate hydrolysis reaction(s).
- determine the pH of the solution

Answer:

- a) The reaction of dissociation of calcium formate excluding hydrolysis:



- b) Calcium formate is a salt which formed by the weak acetic acid. As commonly known, hydrolysis occurs with the weak part of the salt. In that case it is formate anion:



- c) For pH calculation determination of the CH_3COOH concentration in solution is need.

$$n(\text{Ca}(\text{CH}_3\text{COO})_2) = 2n(\text{CH}_3\text{COOH})$$

$$n(\text{Ca}(\text{CH}_3\text{COO})_2) = \frac{m(\text{Ca}(\text{CH}_3\text{COO})_2)}{M(\text{Ca}(\text{CH}_3\text{COO})_2)} = \frac{1.1\text{g}}{158\frac{\text{g}}{\text{mol}}} = 0.007 \text{ moles}$$

$$n(\text{CH}_3\text{COOH}) = \frac{n(\text{Ca}(\text{CH}_3\text{COO})_2)}{2} = \frac{0.007 \text{ moles}}{2} = 0.0035 \text{ moles}$$

$$c(\text{CH}_3\text{COOH}) = \frac{n(\text{CH}_3\text{COOH})}{V} = \frac{0.0035 \text{ moles}}{75 \text{ L}} = 4.6 \cdot 10^{-5} \text{ mol/L}$$

$$\text{pH} = -\lg[\text{H}^+] = -\lg(4.6 \cdot 10^{-5}) = 4.34$$

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