

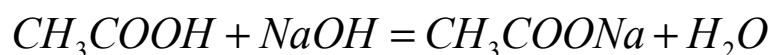
## Answer on Question #63184 - Chemistry - Other

### Task:

Calculate the molarity of a sodium hydroxide solution if 24.3 mL were required to titrate 25.00 mL of a 0.873 M acetic acid solution.

### Solution:

The reaction between acetic acid,  $\text{CH}_3\text{COOH}$ , and sodium hydroxide,  $\text{NaOH}$ , is shown below:



At the equivalence point the moles of the acid ( $\text{CH}_3\text{COOH}$ ) are equal to the moles of the base ( $\text{NaOH}$ ). We can use the known concentration and measured volume of the acetic acid to find the number of moles of acid used in the titration:

$$\text{moles } \text{CH}_3\text{COOH} = \frac{0.873 \text{ mol } \text{CH}_3\text{COOH}}{1 \text{ L}} \times 0.025 \text{ L } \text{CH}_3\text{COOH} = 0.021825 \text{ mol } \text{CH}_3\text{COOH}$$

At the equivalence point:  $\text{mol NaOH} = \text{mol CH}_3\text{COOH}$ , so moles of  $\text{NaOH} = 0.021825 \text{ mol}$ .

The concentration of the sodium hydroxide is equal to the number of moles divided by its volume:

$$\text{molarity of } \text{NaOH} = C(\text{NaOH}) = \frac{0.021825 \text{ mol } \text{NaOH}}{0.0243 \text{ L}} = 0.898 \text{ M}$$

**Answer:**  $C(\text{NaOH}) = 0.898 \text{ M}$  .