

Answer on Question #66542, Chemistry / General Chemistry

In the % acetic acid in vinegar experiment, the % $\text{HC}_2\text{H}_3\text{O}_2$ is given by the equation below. Show the calculation of the % $\text{HC}_2\text{H}_3\text{O}_2$ if 18.7 mL of the standard NaOH above are required to titrate 2.88 grams of vinegar.

$$\% \text{HC}_2\text{H}_3\text{O}_2 = (\text{mL NaOH} / 1000) \times M(\text{NaOH}) \times 60 \times 100$$

Solution:

$$\%, \text{HC}_2\text{H}_3\text{O}_2 = \frac{V(\text{NaOH}) * M(\text{NaOH}) * 60 * 100 \%}{1000 * m(\text{vinegar})}$$

The result depends on molarity of NaOH:

If 1M NaOH was used, we have become:

$$\%, \text{HC}_2\text{H}_3\text{O}_2 = \frac{18.7 * 40 * 60 * 100 \%}{1000 * 2.88} = 1558.3 \%$$

Result is wrong and without sense.

If 0.1M NaOH was used, we have become:

$$\%, \text{HC}_2\text{H}_3\text{O}_2 = \frac{18.7 * 40 * 0.1 * 60 * 100 \%}{1000 * 2.88} = 155.8 \%$$

Result is wrong and without sense.

If 0.01M NaOH was used, we have become:

$$\%, \text{HC}_2\text{H}_3\text{O}_2 = \frac{18.7 * 40 * 0.01 * 60 * 100 \%}{1000 * 2.88} = 15.6 \%$$

Result is right.

Answer: 15.6 %.