

Question #49275, Chemistry, Physical Chemistry

What volume of 1M H₂SO₄ is required to neutralize 10mL of a 1M NaOH solution?

(1)25

(2)20

(3)10

(4)5

All are in mL

Answer:

Necessary to apply the law of equivalents to solve this problem:

$$m_{\text{H}_2\text{SO}_4} / M(1/Z_{\text{H}_2\text{SO}_4}) = m_{\text{NaOH}} / M(1/Z_{\text{NaOH}})$$

$$Z_{\text{H}_2\text{SO}_4} = 2$$

$$Z_{\text{NaOH}} = 1$$

$$C(\text{H}_2\text{SO}_4) = C(\text{NaOH})$$

$$V(\text{H}_2\text{SO}_4) = \frac{1}{2} V(\text{NaOH})$$

$$V(\text{H}_2\text{SO}_4) = 10 \text{ ml} / 2 = \mathbf{5 \text{ ml}}$$

(4) 5 ml