

Answer on the question #43061, Chemistry, Physical Chemistry

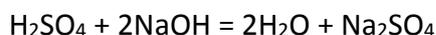
Question:

If 30 mL of an H₂SO₄ solution is neutralized by 60 mL of 1 M NaOH solution, then what is the molarity of the H₂SO₄?

- a) 0.5 M
- b) 1 M
- c) 1.5 M
- d) 2 M

Solution:

The equation of neutralization reaction is:



Thus, 1 mole of sulfuric acid reacts with 2 moles of sodium hydroxide:

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

According to the definition, the molarity is:

$$c = \frac{n}{V}$$

Then, using the equation (1):

$$c(\text{H}_2\text{SO}_4) = \frac{n(\text{H}_2\text{SO}_4)}{V(\text{H}_2\text{SO}_4)} = \frac{n(\text{NaOH})}{2V(\text{H}_2\text{SO}_4)} = \frac{c(\text{NaOH})V(\text{NaOH})}{2V(\text{H}_2\text{SO}_4)} = \frac{60 * 1}{2 * 30} = 1 \frac{\text{mol}}{\text{L}}$$

Answer: b).