Answer on Question #74792, Chemistry / General Chemistry
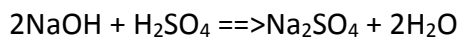
In a titration experiment, 13.3 mL of an aqueous H_2SO_4 solution was titrated with 0.6 M NaOH solution. The equivalence point in the titration was reached when 13.8 mL of the NaOH solution was added. What is the molarity of the H_2SO_4 solution.

Solution:

$2NaOH + H_2SO_4 ==>Na_2SO_4 + 2H_2O$

$$mols\ (NaOH)\ =\ M\ \times\ V$$

$$mols\ (NaOH)\ =\ \frac{0.6\ M}{1\ L} \times\ 0.0138\ L\ =\ 0.00828\ mol$$

Look at the coefficients in the balanced equation

$$mols(\ H_2SO_4)\ =\frac{1}{2}\ \times mols\ (NaOH)$$

$$mols(\ H_2SO_4)\ =\frac{1}{2}\ \times 0.00414\ mol$$

$$M\ (\ H_2SO_4) = \frac{mols\ (\ H_2SO_4)}{V\ (\ H_2SO_4)}$$

$$M\ (\ H_2SO_4) = \frac{0.00414\ mol}{0.0133\ L} = 0.3\ M$$

Answer: 0.3 M (H_2SO_4)