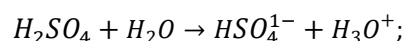


### Question #30164, Chemistry, Inorganic Chemistry

Calculate the pH of sulphuric acid ( $\rho=4.9\text{g/l}$ ). Density of solution 1g/ml. dissociation degree=0.95?

#### Solution

Sulphuric acid dissociates in water:



Find the molarity of sulphuric acid solution (we know that  $m_{H_2SO_4}$  per 1 liter of the solution is 4.9g):

$$M(H_2SO_4) = \frac{m_{H_2SO_4}}{M_{H_2SO_4} \cdot V_{sol}} = \frac{4.9}{98 \cdot 1} = 0.05 \text{ mol/l};$$

where  $M_{H_2SO_4} = 98 \text{ g/mol}$  is the sulphuric acid molar mass.

One mole of dissociated sulphuric acid gives one mole of hydronium ion. So, find hydronium ion molarity;

$$M(H_3O^+) = \alpha \cdot M(H_2SO_4) = 0.95 \cdot 0.05 = 0.0475 \text{ mol/l};$$

Where  $\alpha = 0.95$  is sulphuric acid dissociation degree.

Find the pH of sulphuric acid solution:

$$pH = -\lg[H_3O^+] = -\lg[0.0475] = 1.323$$

**Answer:** the pH of sulphuric acid solution is **1.323**.