Answer to Question #50736, Chemistry, Physical Chemistry

Concentrated aquous sulphuric acid is 98% H_2SO_4 (w/v) and has a density of 1.8gmL^-1. Molarity of the solution .

(1)1M

(2)1.8M

(3)10M

(4)1.5M

Solution:

Lets suppose that we have 1 L os solution, V(H_2SO_4) = 1000 mL

$$c(H_2SO_4) = \frac{n(H_2SO_4)}{V(solution)} = \frac{m(H_2SO_4)}{M_r(H_2SO_4) \times V(solution)} = \frac{m(solution) \times w(H_2SO_4)}{M_r(H_2SO_4) \times V(solution)}$$
$$= \frac{V(solution) \times d(solution) \times w(H_2SO_4)}{M_r(H_2SO_4) \times V(solution)} = \frac{d(solution) \times w(H_2SO_4)}{M_r(H_2SO_4)}$$

$$c(H_2SO_4) = \frac{1800\ \frac{g}{L} \times 0.98}{98\ \frac{g}{mol}} = 18\ \frac{mol}{L} = 18\ M$$

Answer:

18 M