

Answer on Question #72287, Chemistry / General Chemistry |

Question : Methanol has a density of 0.791 g per cubic centimeters at 25 Celsius degrees. Calculate the density of methanol in moles per litre. My answer would be 24.7 moles per litre. My teacher said that it's 0.0000247. Am I wrong?

Solution: Data on the relationship between the concentration of methanol solution and its density can be obtained from reference tables, for example [1]. From the table [1] it is seen that at 25 Celsius degrees the density 0.791 g per cubic centimeters is characteristic for 100% methanol. So

100 g methanol in 100 g solution

Density=Weight/Volume, i.e. Volume=100/0.791=126.42 ml for 100 g solution

Percentage concentration=(100*Solute)/Solution=(100*100)/126.42=79 g methanol in 100 g solution

There is (79.1 g/32 g/mol) = 2.47 mol methanol in 100 g solution, so molarity of solution = 2.47/0.1=24.7 mol per litre

Teacher is not right.

Answer: You are right, density in moles per litre = 24.7 mol/l

Source:

1. <http://www.methanol.org/wp-content/uploads/2016/06/Densities-of-Methanol-Water-Mixes.pdf>