

Conversion from Molarity to Molality

Problem: Find the molality of **18 M H₂SO₄**. This solution has a density of **1.84 g/mL**.

Step 1. Make an assumption.

Assume you have 1 L of solution. This is a very important step and the amount of solution is not given but you need to have a specific quantity to do the calculations and one liter is the best assumption for this problem.

Step 2. Find the total mass of the solution.

Multiply 1 L X the density (1.84 g/mL) X 1000 mL/L. This gives 1840 grams of solution.

Step 3. Calculate the grams of the solute.

18M means 18 moles of sulfuric acid per one liter of solution. Convert 18 moles to grams. The molar mass of sulfuric acid is 98.09 g/mol.

18 moles X 98.09 g/mol = 1765.62 grams of sulfuric acid.

Step 4. Calculate the grams of the solvent.

1840 grams of solution - 1765.62 grams of solute = 74.38 grams solvent.

Step 5. Calculate the molality.

18 moles solute / 0.07438 kg solvent = **242 molal H₂SO₄**