Odebral se 12,0-litrový vzorek vzduchu o teplotě 25 °C a tlaku 1,00 atm a vysušil se. Po vysušení byl objem vzorku přesně 11,50 l. Jaké bylo hmotnostní procento vody v původním vzorku vzduchu?

A 12.0-liter sample of air at 25°C and 1.00 atm pressure was collected and dried. After
drying, the volume of the sample was exactly 11.50 L. What was the percentage *by mass*
of water in the original air sample?

Answer: Under the conditions given, a mole of dry air occupies:

22.4L×(298 K/273 K) = 24.5 L/mol

mol dry air = 11.5L/(24.5 L/mol) = 0.469 mol

The average molar mass of dry air is 29.1 g/mol

The mass of dry air = 0.469 mol × 29.1 g/mol = 13.6 g

mols of H_2O = 0.5L/(24.5 L/mol) = 0.0204 mol

mass of H_2O = 0.0204 mol ’□ 18.0 g/mol = 0.367 g

% H_2O by mass = 100 × 0.367 g/(13.6 g + 0.367 g) = 2.62 %