Question #62368, Chemistry / Physical Chemistry | completed

***Question*:**

Calculate the molecular mass of 9.21 g non-volatile organic compound, dissolved in 50 g of pure water at 25°C, which depresses the vapor pressure of the water from 3.16×10^3 to 3.10×10^3 N/m^{-2}.

Solution:

Raoult's law:

$\Delta p/p$ = N, molar%

$(3.16-3.10) \times 10^3/3.16 \times 10^3 = N$

$N = m(A) / M(A) \div (m(A) / M(A) + m(H_2O) / M(H_2O))$

A - organic compound, M (A) or Mr (A) = x, molecular mass

then: $(3.16-3.10)/3.16 = 9.21/x \div (9.21/x + 50/18)$

$x = 171.3$ or Mr (A) = 171.3

Answer: 171.3