**Question:**

A sample of 3.00 g of an unknown substance was dissolved in 10.0 g of ethanol. This solution was found to have a freezing point 4.5 °C lower than pure ethanol. Find the molar mass of the unknown substance.

**Answer:**

$$M_1 = \frac{K_k \cdot m_1}{\Delta T \cdot m_2}$$

$m_1$: mass of the dissolved substance in g, $m_2$: mass of the solvent in g, $M_1$: molar mass of the dissolved substance in g/mol, $\Delta T$: the freezing-point depression, $K_k$: the cryoscopic constant (characteristic of every solvent). $K_k$ = 1990 K·g/mol.

**$M_1$** = 1990·3/(4.5·10) = **132.67 g/mol**