

Answer on Question 77076 in General Chemistry

$$m(\text{CaCl}_2) = 25.0 \text{ g}$$

$$V(\text{H}_2\text{O}) = 250 \text{ mL}$$

$$K_b(\text{H}_2\text{O}) = 0.512^\circ\text{C}/m$$

$$t(\text{boiling}) = ?$$

According to the ebullioscopy

$$\Delta t = i \times C_m \times K_b$$

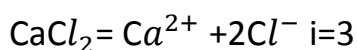
$$C_m = \frac{m(\text{CaCl}_2)}{M_r(\text{CaCl}_2) \times m(\text{H}_2\text{O})}$$

$$\text{Find } M_r(\text{CaCl}_2) = A_r(\text{Ca}) + 2A_r(\text{Cl}) = 40 + 2 \times 35.5 = 111$$

Considering the density of water $\rho(\text{H}_2\text{O}) = 1 \text{ g/mL}$

$$m(\text{H}_2\text{O}) = V(\text{H}_2\text{O}) = 250 \text{ g}$$

CaCl_2 is a strong electrolyte which is completely dissociated according to equation



$$C_m = \frac{25}{111 \times 0.25} = 0.9 \text{ mol/kg}$$

$$\Delta t = 3 \times 0.9 \times 0.512 = 1.38^\circ\text{C}$$

$$t_{\text{b}} = t_{\text{b}}(\text{H}_2\text{O}) + \Delta t = 100 + 1.38 = 101.38^\circ\text{C}$$

Answer provided by AssignmentExpert.com