

Problem 13-15 Boiling point elevation of electrolyte solutions

1.5 mol of NaCl, 1.3 mol of Na₂SO₄, 2.0 mol of MgCl₂, and 2.0 mol of KBr were dissolved, each in 10 litres of water. Array these solutions according to the decreasing boiling temperature.

[MgCl₂ - KBr - Na₂SO₄ - NaCl]

Solution:

$$\Delta T_b = i \cdot m \cdot K_E$$

$$\Delta T_b (\text{NaCl}) = 2 \cdot (1.5/10) \cdot K_E = 0.3 \cdot K_E$$

$$\Delta T_b (\text{Na}_2\text{SO}_4) = 3 \cdot (1.3/10) \cdot K_E = 0.39 \cdot K_E$$

$$\Delta T_b (\text{MgCl}_2) = 3 \cdot (2.0/10) \cdot K_E = 0.6 \cdot K_E$$

$$\Delta T_b (\text{KBr}) = 2 \cdot (2.0/10) \cdot K_E = 0.4 \cdot K_E$$

[MgCl₂ - KBr - Na₂SO₄ - NaCl]