Question#74968 – Chemistry – General Chemistry

Question: A solution of $KClO_3$ is prepared using 75 grams of the solute in enough water to make 0.250 liters of solution. The gram-formula mass of $KClO_3$ is 122 grams per mole. Determine the molarity (concentration in mol/L) of the solution. Assuming the solution is saturated, determine the temperature of the solution.

Solution:

1. Find moles of $KClO_3$.

$$n(KClO_3) = \frac{75\ g}{122\ \frac{g}{mol}} = 0.615\ mol$$

2. Find a concentration:
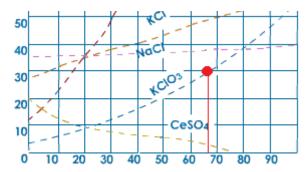
$$C_M = \frac{0.615\ mol}{0.250\ L} = 2.46\ M$$

3. Find a solubility (in g/100 H_2O):

$$m(H_2O) = 250\ g$$

$$s = \frac{75\ g}{250\ g\ H_2O} \times 100g\ H_2O = 30g/(100\ g\ H_2O)$$

4. Find the temperature of the solution from solubility curve:

T≈68°C

Answer:

$$C_M = 2.46\ M$$

T≈68°C