Answer on Question #54165 – Chemistry – Other

Task:

2. a. How will you decide whether a process is spontaneous in this experiment?

b. If you were to use this method after you had observed the fate of an ice cube at 25°C, what would you conclude about the spontaneity of the following process?

Why? $H_2O(s) \rightarrow H_2O(l)$

c. The standard enthalpy change for this process is 6.01 kJ/mol. What is the minimum value for the standard entropy change, based upon your conclusions about the spontaneity?

3. During this experiment, you will be required to prepare 100 mL of a 1.0 M solution of $NaNO_3$. Calculate the mass of $NaNO_3$ (to the nearest tenth of a gram) that will be required?

Answer:

2 a. The process will be spontaneous if Gibbs energy is ΔG<0.

2 b. Fate of an ice cube at 25°C is a spontaneous process.

2 c. To be spontaneous the process must fulfill the condition $\Delta H - T\Delta S < 0$.

$6.01 - (25 + 273) \cdot \Delta S < 0$

$\Delta S > 0.02$

3.

$C_M = \dfrac{v}{V}$ $v = C_M \cdot V$

$v = \dfrac{m}{M}$ $m = v \cdot M$

$v(NaNO_3) = 0.1 \cdot 1.0 = 0.1 mol$

$M(NaNO_3) = 85 g/mol$

$m(NaNO_3) = 0.1 \cdot 85 = 8.5 g$