Answer on Question #77095 - Chemistry - Physical Chemistry

Question:

Calculate the entropy change when 36 g of ice is heated at standard pressure from 230 K to 320 K. Take the molar heat

capacities at constant pressure, Cp,m, of water and ice to be

75.3 and 37.7 J mol 1 -1 respectively, and the molar enthalpy

of fusion of ice to be 6.02 kJ mol-^. The molar mass of water is 18.0 g mol-1, and ice melts at a temperature of 273.15 K。

Solution:

From the definition of entropy. The change in entropy, where is the molar heat capacity at constant pressure.

$\Delta S_{vap} = \frac{\Delta H_{vap}}{T_b} = \frac{40.63 \times 1000 J/mol}{373 K} = 109 J/K - mol$

So, Entropy change for evaporation of 36 g of water = $109 \times 3618 = 218 J/K$.