

Answer on Question #77171 - Chemistry - Physical Chemistry

Question:

Given that the molar volume change on melting ice is -1.56 cm^3

mol^{-1} , the molar enthalpy of fusion is $6.030 \text{ kJ mol}^{-1}$, and the melting temperature of ice at atmospheric pressure (105 Pa) is 273.15 K,

calculate the melting temperature of ice at a pressure of 7 MPa.

Solution:

$$\ln(P_2/P_1) = \Delta H/R * (1/T_1 - 1/T_2)$$

$$(1/T_1 - 1/T_2) = \ln(P_2/P_1) * R/H$$

$$(1/T_1 - 1/T_2) = 11.107 * 8.314 / 6030 = 0.0153$$

$$1/T_2 = 1/T_1 - 0.0153$$

$$1/T_2 = 0.01164$$

$$T_2 = 85.91 \text{ K.}$$

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