

CH301H – Principles of Chemistry I: Honors
Fall 2012, Unique 51390

Quiz 6, 6 December 2012

Calculate the melting point of ice under a pressure of 50 atm. The density of ice under these conditions is approximately 0.92 g cm^{-3} , the density of liquid water is 1.0 g mL^{-1} , and the enthalpy of fusion (phase transition between solid and liquid) is $6.01 \times 10^3 \text{ J mol}^{-1}$.

$$P = 50 \text{ atm}$$

$$\rho_{\text{ice}} = 0.92 \text{ g/cm}^3$$

$$\rho_{\text{L}} = 1.0 \text{ g/mL}$$

$$\Delta H_{\text{fus}} = 6.01 \times 10^3 \text{ J/mol}$$

$$\Delta T = T_f - T_c$$

↑ ↙
 $T_{\text{at } 50 \text{ atm}}$ $T_{\text{at } 1 \text{ atm}}$

$$\Delta T = \frac{T_f \Delta P (FW)}{\Delta H_{\text{fus}}} \Delta \left(\frac{1}{\rho} \right)$$

$$\Delta T = -0.35 \text{ K}$$

$$T_f(50 \text{ atm}) = 272.65 \text{ K.}$$