Exercise Set 1: Liquids, Solids, and Materials

January 17 2021

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7. The chlorofluorocarbon CCl_3F has enthalpy of vaporization of $24.8\,{}^{kJ}\!/_{mol}$. To vaporize $1.00\,kg$ of the compound, how much thermal energy transfer is required?

   $$1\,kg \times \frac{1\,kg}{1000\,g} \times \frac{1\,mol}{173.359\,g} \times \frac{248\,kJ}{1\,mol} = 180\,kJ$$
   $$kJ = 180\,kJ$$

8. The molar enthalpy of vaporizatiom of methanol is $38.0\,{}^{kJ}\!/_{mol}$ at 25°C. How much thermal energy transfer is required to convert $250\,mL$ of the alcohol from liquid to vapor? The density of CH_3OH is $0.787\,{}^{g}\!/_{mL}$ at 25°C.

   $$250\,mL \times \frac{0.787\,g}{1\,mL} \times \frac{1\,mol}{32.04\,g} \times \frac{38\,kJ}{1\,mol} = 233\,kJ$$

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19. In this phase diagram, make these identifications:
    a) What phase is present in region A? Region B? Region C?
       Region A = Solid, Region B = Liquid, Region C = Gas.

    b) What phases are in equilibrium at point 1? Point 2? Point 3? Point 5?
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