

HW2-3 Soln)

Find the inflection point on the lowest curve; it appears that  $V_C$  is about 0.0043 liters/mole or  $4.3 \times 10^{-6} \text{ m}^3/\text{mole}$ .

Then,

$$V_o = \frac{1}{3N_A} \left( \frac{V}{n} \right)_C = \frac{1}{3(6.023 \times 10^{23})} \times 4.3 \times 10^{-6} = 2.38 \times 10^{-30} \text{ m}^3$$

Divide this up equally among the three atoms:

$$V_{O_2} = 8 \times 10^{-31} \text{ m}^3$$

Then,

$$d_{O_2} = \sqrt[3]{\frac{6 V_{O_2}}{\pi}} = \sqrt[3]{\frac{6 (8 \times 10^{-31})}{\pi}} = 1.2 \times 10^{-10} \text{ m} = 1.2 \text{ \AA}$$