

## Chapter 3 – Problems 6, 60

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September 14, 2020

6. A solid circular cone made of pure platinum ( $d = 21.45[\text{g cm}^{-3}]$ ) has a diameter of  $2.75[\text{cm}]$  and a height of  $3[\text{in}]$ . (a) How many moles of platinum are in the cone? (b) How many electrons are in the cone?

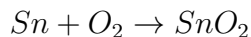
(a)  $3[\text{in}] \rightarrow 7.62[\text{cm}]$

$$m = V\rho \rightarrow \frac{1}{3}\pi \cdot 1.375^2 \cdot 7.62 \cdot 21.45 = 323.61[\text{g}]$$

$$\text{mol}_{Pt} = \frac{323.61[\text{g}]}{195[\text{g mol}^{-1}]} = 1.66[\text{mol}]_{Pt}$$

(b)  $1.66[\text{mol}] \cdot 78 \cdot 6.02 \cdot 10^{23} = 7.79 \cdot 10^{25}$

60. When tin comes in contact with the oxygen in the air, tin (IV) oxide,  $\text{SnO}_2$ , is formed. A piece of tin foil,  $8.25[\text{cm}] \cdot 21.5[\text{cm}] \cdot .6[\text{mm}]$ , ( $d = 7.28[\text{g cm}^{-3}]$ ), is exposed to oxygen. (a) Assuming that all the tin has reacted, what is the mass of the oxidized tin foil? (b) Air is about 21% oxygen by volume ( $d = 1.309[\text{g L}^{-1}]$ ). How many liters of air are required to completely react with the tin foil?



(a)  $.6[\text{mL}] = .06[\text{cm}]$

$$V = 8.25 \cdot 21.5 \cdot .06 = 10.65[\text{cm}^3] \rightarrow m = \rho V = 10.65 \cdot 7.28 = 77.5[\text{g}]$$

$$\frac{77.5}{119} = .65[\text{mol}_{Sn}] = 1.3[\text{mol}_O \cdot 16 = 20.8[\text{g}] + 77.5[\text{g}] = 98.3[\text{g}]$$

(b)  $.21 \cdot 1.309 = .275[\text{g L}^{-1}_O]$

$$\frac{1}{.275} \cdot 20.8 = 76[\text{L}]$$