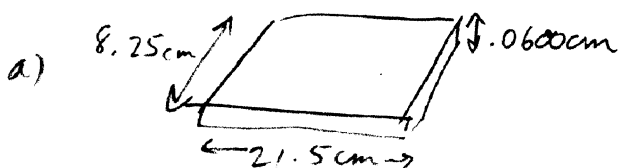
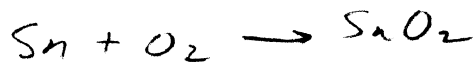


60



$$10.64 \text{ cm}^3 (7.28 \text{ g/cm}^3) = 77.5 \text{ g Sn}$$

$$77.5 \text{ g Sn} / 118.78 \text{ g/mol} = .653 \text{ mol Sn}$$



$$.653 \text{ mol Sn} \left(\frac{1 \text{ mol SnO}_2}{1 \text{ mol Sn}} \right) = .653 \text{ mol SnO}_2$$

$$.653 \text{ mol SnO}_2 \left(\frac{150.7 \text{ g SnO}_2}{1 \text{ mol}} \right) = \boxed{98.4 \text{ g SnO}_2}$$

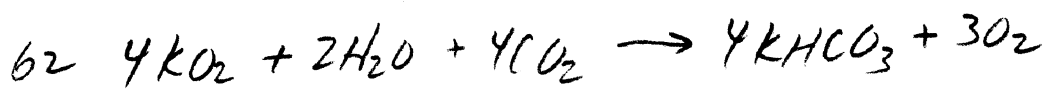
b)

$$.653 \text{ mol Sn} \left(\frac{1 \text{ mol O}_2}{1 \text{ mol Sn}} \right) = .653 \text{ mol O}_2$$

$$.653 \text{ mol O}_2 (32.0 \text{ g O}_2 / \text{mol}) = 20.896 \text{ g O}_2$$

$$20.896 \text{ g O}_2 \left(\frac{1 \text{ L}}{1.309 \text{ g}} \right) \approx 16.0 \text{ L O}_2$$

$$16.0 \text{ L} = .21 X \quad X = \frac{16.0 \text{ L}}{.21} \approx \boxed{76.0 \text{ L air}}$$



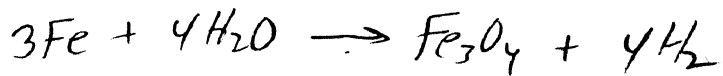
$$0.702 \frac{\text{g CO}_2}{\text{min}} (25 \text{ min}) = 17.55 \text{ g CO}_2$$

$$\text{mol CO}_2 = \frac{17.55 \text{ g CO}_2}{44.01 \text{ g/mol}} = .399 \text{ mol CO}_2$$

$$.399 \text{ mol CO}_2 \times \frac{4 \text{ mol KO}_2}{4 \text{ mol CO}_2} = .399 \text{ mol KO}_2$$

$$.399 \text{ mol KO}_2 (71.10 \text{ g/mol}) = \boxed{28 \text{ g KO}_2}$$

66



897 g desired (Actual)

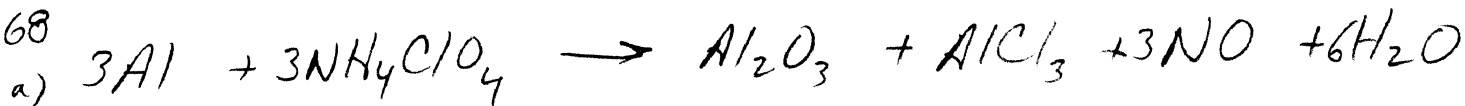
$$x(.69) = 897 \quad x = 1300 \text{ g Fe}_3\text{O}_4 \text{ (theoretical)}$$

$$\text{ml Fe}_3\text{O}_4 = \frac{1300 \text{ g}}{231.55 \text{ g/ml}} = 5.61 \text{ ml Fe}_3\text{O}_4$$

$$5.61 \text{ ml Fe}_3\text{O}_4 \left(\frac{3 \text{ ml Fe}}{1 \text{ ml Fe}_3\text{O}_4} \right) = 16.8 \text{ ml Fe}$$

$$16.8 \text{ ml Fe} (55.85 \text{ g/ml}) = \boxed{9.4 \times 10^2 \text{ g Fe}}$$

68



$$\text{b) } 7.00 \text{ g Al} \quad 9.32 \text{ g NH}_4\text{ClO}_4$$

$$\text{ml Al} = 7.00 / 26.98 \text{ g/ml} = .259 \text{ ml Al}$$

$$\text{ml NH}_4\text{ClO}_4 = 9.32 \text{ g} / 117.492 \text{ g/ml} = .079 \text{ ml NH}_4\text{ClO}_4$$

Since Al combines with NH_4ClO_4 in a 1:1 ratio

NH_4ClO_4 limits

$$.079 \text{ ml NH}_4\text{ClO}_4 \left(\frac{1 \text{ ml Al}_2\text{O}_3}{3 \text{ NH}_4\text{ClO}_4} \right) = .026 \text{ ml Al}_2\text{O}_3$$

$$\text{g Al}_2\text{O}_3 = .026 \text{ mol Al}_2\text{O}_3 (101.96 \text{ g/mol}) = 2.65 \text{ g} \approx \boxed{2.7 \text{ g Al}_2\text{O}_3}$$

$$\text{c) } 1.56 \text{ g formed} / 2.7 \text{ g theoretical} = \boxed{57.8 \%}$$

$$\text{d) } \text{moles Al used} = .079$$

$$\text{moles Al left} = .259 - .079 = .180 \text{ mol Al}$$

$$\text{g Al} = .180 \text{ mol Al} (26.98 \text{ g/mol}) = \boxed{4.86 \text{ g Al}}$$