When 18.3 g of sodium are dropped into 5.97×10^{24} molecules of water, how many g of hydrogen are produced?

$2\,Na + 2\,HOH \longrightarrow H_2 + 2\,NaOH$

18.3 g Na; 5.97×10^{24} mc HOH; ? g H_2

$18.3\text{ g Na} \times \frac{1\text{ mol}}{22.98977\text{ g}} \times \frac{1\text{ H}_2}{2\text{ Na}} \times \frac{2.0158\text{ g}}{1\text{ mol}} = .802\text{ g H}_2$

$5.97 \times 10^{24}\text{ mc HOH} \times \frac{1\text{ mol}}{N_A\text{ mc}} \times \frac{1\text{ H}_2}{2\text{ HOH}} \times \frac{2.0158\text{ g}}{1\text{ mol}} = 9.99\text{ g H}_2$

Sep 4-10:23 PM

When 32.66 mL of a 2.06 M solution of phosphoric acid react with 12.06 g of barium nitrate, how many g of barium phosphate are produced? What is the limiting reagent? Which reactant is in excess? How much excess is there?

$2\,H_3PO_4 + 3\,Ba(NO_3)_2 \longrightarrow Ba_3(PO_4)_2 + 6\,HNO_3$

32.66 mL, 2.06 M H_3PO_4; 12.06 g $Ba(NO_3)_2$; ? g $Ba_3(PO_4)_2$

$32.66\text{ mL H}_3\text{PO}_4 \times \frac{2.06\text{ mol}}{1000\text{ mL}} \times \frac{1\text{ Ba}_3(\text{PO}_4)_2}{2\text{ H}_3\text{PO}_4} \times \frac{601.924\text{ g}}{1\text{ mol}} = 20.3\text{ g Ba}_3(\text{PO}_4)_2$

$12.06\text{ g Ba(NO}_3)_2 \times \frac{1\text{ mol}}{261.547\text{ g}} \times \frac{1\text{ Ba}_3(\text{PO}_4)_2}{3\text{ Ba(NO}_3)_2} \times \frac{601.924\text{ g}}{1\text{ mol}} = 9.25\text{ g Ba}_3(\text{PO}_4)_2$

$9.25\text{ g Ba}_3(\text{PO}_4)_2 \times \frac{1\text{ mol}}{601.924\text{ g}} \times \frac{2\text{ H}_3\text{PO}_4}{1\text{ Ba}_3(\text{PO}_4)_2} \times \frac{1000\text{ mL}}{2.06\text{ mol}} = 14.9\text{ mL H}_3\text{PO}_4\text{ used}$

$\left(\frac{9.25}{20.3}\right)(32.66\text{ mL}) = \text{used}$

XS = 32.66 − 14.9 =

17.8 mL XS

Sep 4-10:23 PM

When 18.9 g of iron burn in 5.99L of oxygen gas (at STP), what mass of iron III oxide can be produced, what is in excess and how much excess is there?

22.4 L/mol

$4\,Fe + 3\,O_2 \longrightarrow 2\,Fe_2O_3$

18.9 g 5.99 L ? g

$18.9\ g\ Fe \times \frac{1\ mol}{55.845\ g} \times \frac{2\ Fe_2O_3}{4\ Fe} \times \frac{159.688\ g}{1\ mol} = 27.0\ g\ Fe_2O_3$

$5.99\ L\ O_2 \times \frac{1\ mol}{22.4\ L} \times \frac{2\ Fe_2O_3}{3\ O_2} \times \frac{159.688\ g}{1\ mol} = 28.5\ g\ Fe_2O_3$

$27.0\ g\ Fe_2O_3 \times \frac{1\ mol}{159.688\ g} \times \frac{3\ O_2}{2\ Fe_2O_3} \times \frac{22.4\ L}{(1\ mol)} = 5.68\ L\ O_2$

$5.99\ L \left(\frac{27.0}{28.5}\right) = 5.68\ L$

$5.99 - 5.68 = .31\ L\ O_2$ XS

Sep 21-9:12 AM