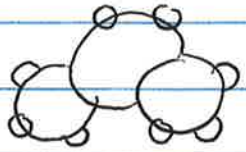
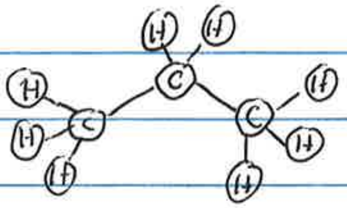
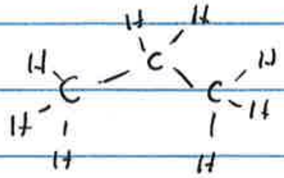
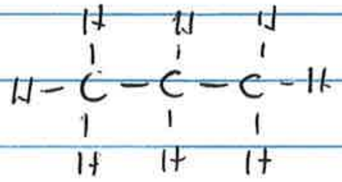
Today: Sept 12 - sections 3.1-3.3
Friday: Sept 14 - sections 3.4-3.5
Sunday: problem club with Ali
Monday: Sept 17 - finish ch 3
⋮
Sept 26 - ck 2









C_3H_8

* these all represent the same compound

balancing reactions:

~~[illegible]~~

"link lines"

$$Fe_2O_3(s) + 3H_2(g) \rightarrow 2Fe(s) + 3H_2O(\ell)$$

2	Fe	2	✓
3	O	3	✓
6	H	6	✓

Combustion reaction: combination with oxygen to produce CO_2 and H_2O usually

$$C_3H_8 + 5O_2 \longrightarrow 3CO_2 + 4H_2O$$

$$P_4S_6 + {}^{11}O_2 \longrightarrow 2P_2O_5 + 6SO_2$$

Stoichrometry

needs 1mol ↙

needs 11 mols ↙

$$1P_4S_6 + 11O_2 \longrightarrow 2P_2O_5 + 6SO_2$$

which will run out first?

$\boxed{1mol}$	12mols
$\boxed{0.72mol}$	8.13mols
2mols	$\boxed{20mols}$

*whichever runs out first is called the limiting reagent

determining limiting reagent:

divide mols by coefficient, the small number is limiting reagent

$$\frac{2mols}{1} = 2 \qquad \boxed{\frac{20 mols}{11} = 1.81} \text{ LR}$$

$$\overset{LR}{\boxed{\frac{0.72mol}{1} = 0.72}} \qquad \frac{8.13mols}{11} = .74$$

How much products (P_2O_5 or SO_2) am I expecting? ← Theoretical yield (TY)

TY = LR x Stoich

for P_2O_5: $TY = \frac{0.72 mol\ P_4S_6 \mid 2mol\ P_2O_5}{\mid 1mol\ P_4S_6} = 1.44 mol\ P_2O_5$

for SO_2: $TY = \frac{0.72 mol\ P_4S_6 \mid 6 mol\ SO_2}{\mid 1mol\ P_4S_6} = 4.32\ mol\ SO_2$

Suppose 4.63 mol P_4S_6 and 49.4 mol O_2 are reacted:
What is the theoretical yield of P_2O_5? Of SO_2

$$P_4S_6 + 11O_2 \rightarrow 2P_2O_5 + 6SO_2$$

$$\frac{4.63\text{mol}}{1} = 4.63 \qquad \boxed{\frac{49.4}{11} = 4.49}\ \text{LR}$$

$$TY = \frac{49.4\text{mol } O_2}{} \bigg| \frac{2\text{mol } P_2O_5}{11\text{mol } O_2} = 8.98\text{mol } P_2O_5$$

$$TY = \frac{49.4\text{ mol } O_2}{} \bigg| \frac{6\text{ mol } SO_2}{11\text{mol } O_2} = 26.95\text{ mol } SO_2$$

$$m_A \rightarrow n_A \rightarrow n_B \rightarrow m_B$$

$$P_4S_6 + 11O_2 \rightarrow 2P_2O_5 + 6SO_2$$

MM	4×30.97 + 6×32.06	2×16.00	2×30.97 + 5×16.0	32.06 + 2×16
	316.24g/mol	32g/mol	141.94g/mol	64.1g/mol

Determine the LR if 24.4g P_4S_6 and 2.96g O_2 are reacted.

Go moles!

$$n_{P_4S_6} = \frac{24.4g\ P_4S_6}{} \bigg| \frac{1\text{ mol } P_4S_6}{316.24g\ P_4S_6} = 0.0772\text{ mol } P_4S_6$$

$$n_{O_2} = \frac{2.96g\ O_2}{} \bigg| \frac{\text{mol } O_2}{16.0g\ O_2} = 0.0925\text{ mol } O_2$$

$$\text{LR?} \quad \frac{0.0772\text{ mol } P_4S_6}{1} = 0.0772 \qquad \boxed{\frac{0.0925\text{mol } O_2}{11} = 0.0084}\ \text{LR}$$

What mass of P_2O_5 is expected?

$$\frac{0.0925\text{mol } O_2}{} \bigg| \frac{2\text{mol } P_2O_5}{11\text{mol } O_2} \bigg| \frac{141.94g\ P_2O_5}{1\text{mol } P_2O_5} = \boxed{2.39g\ P_2O_5}$$