Limiting Reactant Practice Problems
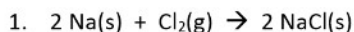
1. 2 Na(s) + Cl₂(g) → 2 NaCl(s)
    a) 6.0 mol of Na and 4.0 mol of Cl₂ are mixed. How many moles of NaCl in moles can be made from this mixture?
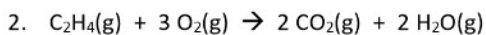   b) What is the limiting reactant?
    c) What is the excess reactant?

	②Na +	Cl₂ →	2 NaCl
B	6 mol	4 mol	Ø
C	LR −6	−6($\frac{1}{2}$) = −3	+6($\frac{2}{2}$) = +6
A	6 − 6 = Ø Limiting	4 − 3 = 1 mol Cl₂ Excess	Ø + 6 = 6 mol NaCl

a) 6.0 mol NaCl

b) LR = Na

c) Excess = Cl₂

2. $C_2H_4(g) + 3 O_2(g) \rightarrow 2 CO_2(g) + 2 H_2O(g)$
   a) 2.7 mol of C_2H_4 is reacted with 6.3 mol of O_2, how many moles of water will be made?
   b) What is the limiting reactant?
   c) What is the excess reactant?

H_2O?

	C_2H_4 +	$3 O_2$	$\longrightarrow$	$2 CO_2$ +	$2 H_2O$
B	2.7 mol	6.3 mol		Ø	Ø
C	LR −2.7	$-2.7\left(\frac{3}{1}\right)$ $= -8.1$ NOT ENOUGH		$+2.7\ (\ )$	$+2.7(\ )$
C	$-6.3\left(\frac{1}{3}\right)$ $= -2.1$	LR -6.3		$+6.3\left(\frac{2}{3}\right)$ $= +4.2$	$+6.3\left(\frac{2}{3}\right)$ $= +4.2$
A	2.7 −2.1 $= 0.6$ mol C_2H_4 EXCESS	6.3 −6.3 $= Ø$ Limiting		Ø + 4.2 $= 4.2$ mol CO_2	Ø + 4.2 $= 4.2$ mol H_2O

a) 4.2 mol H_2O

b) LR = O_2

c) Excess = C_2H_4

3. $2\,Cu(s) + S(s) \rightarrow Cu_2S(s)$ 4 SIG FIGS   4 SIG FIGS

a) If 80.00 grams of copper is reacted with 25.00 grams of sulfur, how many grams of product can be produced?   g Cu_2S?

b) What is the limiting reactant?

c) What is the excess reactant?

d) How many grams of the excess reactant are left over at the end of the reaction?

$$\frac{80\ g\ Cu}{}\Bigg|\frac{1\ mol\ Cu}{63.55\ g\ Cu} = 1.2589\ mol\ Cu\ \ BEFORE$$

$$\frac{25\ g\ S}{}\Bigg|\frac{1\ mol\ S}{32.07\ g\ S} = 0.7795\ mol\ S\ \ BEFORE$$

	②Cu +	$S \longrightarrow$	Cu_2S
B	1.2589 mol	0.7795 mol	∅
C (LR)	−1.2589	$-1.2589\left(\frac{1}{2}\right)$ = −0.6295	$+1.2589\left(\frac{1}{2}\right)$ = +0.6295
A	1.2589 −1.2589 = ∅	0.7795 −0.6295 = **0.15 mol S**	∅ +0.6295 = 0.6295 mol Cu_2S

a) $\dfrac{0.6295 \text{ mol } Cu_2S}{} \bigg| \dfrac{159.17 \text{ g } Cu_2S}{1 \text{ mol } Cu_2S} = 100.1975$

$= \boxed{100.2 \text{ g } Cu_2S}$

4 Sig Figs

b) LR = Cu

c) Excess = S

d) $\dfrac{0.15 \text{ mol } S}{} \bigg| \dfrac{32.07 \text{ g } S}{1 \text{ mol } S} = 4.8105$

$= \boxed{4.811 \text{ g } S}$

4 sig figs