High School Science Virtual Learning

Chemistry

Limiting Reactants

April 24th, 2020

Chemistry

Lesson: April 24th 2020

Objective/Learning Target:

The learner will be able to determine the limiting reactant in a reaction and calculate the theoretical and percent yield for a problem with multiple reactants. They will also be able to calculate the amount of excess reactant leftover.

Bell Ringer

$$4\ FeCl_3 + 3O_2 \rightarrow 2Fe_2O_3 + 6Cl_2$$

1. How many moles of Chlorine gas can be produced if 4 moles of $FeCl_3$ reacts with 4 moles of O_2?
2. How many moles of the excess is leftover?

Bell Ringer Answers:

1. 4 ~~mol $FeCl_3$~~ x (6 mol Cl_2/4 ~~mol $FeCl_3$~~) = ***6 mol Cl_2***

   ~~4 mol O_2 x (6 mol Cl_2/3 mol O_2) = 8 mol Cl_2~~

2. 4 ~~mol $FeCl_3$~~ x (3 mol O_2/4 ~~mol $FeCl_3$~~) = 3 mol O_2 used

   4 mol O_2 - 3 mol O_2 used = ***1 mol O_2 leftover***

Lesson:

Limiting Reactant Problems Give you a chance to practice all areas of stoichiometry. Review with the following video and do the practice on the next slide.

Limiting Reagent Made Easy-Ketzbook (8:10)

Practice

$$\_\_C_2H_6 + \_\_O_2 \rightarrow \_\_ CO_2 + \_\_ H_2O$$

Given 20.0 g of C_2H_6 and 50.0 g O_2 answer the following.

1) Balance the reaction.
2) Which reactant is the limiting reagent?
3) How many grams of CO_2 are formed?
4) How many grams of the excess reactant remains after the reaction?

Answers

1. $\underline{2}C_2H_6 + \underline{7}O_2 \rightarrow \underline{4}\ CO_2 + \underline{6}\ H_2O$
2. ~~20.0g C_2H_6 x (1mol C_2H_6/30.0g C_2H_6) x (4mol CO_2/2 mol C_2H_6)=1.33 mol CO_2~~
   50.0g O_2 x (1mol O_2/32.0g O_2) x (4 mol CO_2 /7mol O_2) =0.893 mol CO_2
   O_2 is limiting
3. 0.893mol CO_2 x (44.0g CO_2/1mol CO_2)= ***39.3g CO_2***
4. 50.0g O_2x(1mol O_2/32.0g O_2)x(2 mole C_2H_6/7mol O_2)x(30.0g C_2H_6/1mol C_2H_6)
   = ***13.4 g C_2H_6 used***
   20.0g C_2H_6(starting)-13.4g C_2H_6(used) = ***6.6 g C_2H_6 remaining***

Try some more:

Quizizz- Limiting Reactant

Another Quizizz- Limiting Reactant

Xtra Video

How to Find Limiting Reactants (Strawberry smoothie)- Melissa Maribel(8:51)