Chemistry CP

Name:

Modeling Limiting Reagent Problems

Date:

Purpose

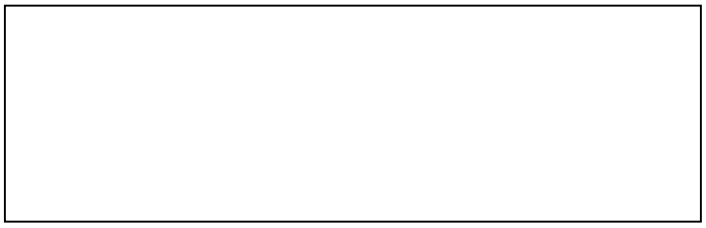
To demonstrate the concept of a limiting reagent in a chemical reaction, $M_2 + 3\ C_2 \rightarrow 2\ MC_3$

Materials

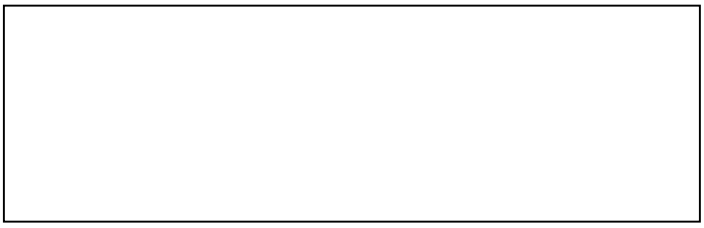
20 metal paper clips (symbol = M)
20 identical colored paper clips (symbol = C)
1 plastic sandwich bag

Procedure

1. Join together pairs of paper clips of the same color to form models representing 10 diatomic molecules of each reactant. Place these molecules in the plastic bag.
2. Without looking, choose 15 molecules from the bag.
3. Line up the M_2 and C_2 molecules in two adjacent columns. Sketch your initial conditions in the space below (include a key):



4. Pair up reactant molecules in the 1:3 M_2-to-C_2 ratio as shown in the balanced equation $M_2 + 3\ C_2 \rightarrow 2\ MC_3$. Make the molecules "react" by taking them apart and forming two molecules of the products.
5. Continue making M_2 and C_2 react in a 1:3 ratio until you run out of one of the reactants. Include a sketch of your final conditions:



Analyze and Apply

1. Which reactant molecule was the limiting reactant?

2. How many molecules of the product were formed?

3. How many molecules of the excess reagent remained at the completion of the reaction?

4. How is the reaction "limited" in a limiting reactant situation?