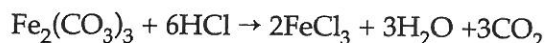


## 11-2 Apply

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### *Atomic Accounting*

Tina and Louisa are interested in the reaction that takes place between iron(III) carbonate ( $\text{Fe}_2(\text{CO}_3)_3$ ) and hydrochloric acid (HCl). They know that the reaction produces iron(III) chloride ( $\text{FeCl}_3$ ), water, and carbon dioxide. The balanced equation for this reaction is



1. Tina adds 217 g of iron(III) carbonate to a beaker containing HCl. Calculate the mass of iron(III) chloride and the mass of water that are produced in the reaction.
  
2. Louisa wants to fill a large balloon with the carbon dioxide that is produced by this reaction. What mass of hydrochloric acid will she have to use in order to produce a volume of 100. L of  $\text{CO}_2$  at STP?
  
3. How many molecules of iron(III) carbonate does Tina need to react with  $5.0 \times 10^{25}$  molecules of HCl? What is the mass of this quantity of iron(III) carbonate?
  
4. Tina and Louisa notice that in the balanced equation for this reaction a total of 7 moles of reactants combines to form a total of 8 moles of products. Explain why this apparent imbalance does not violate the law of conservation of mass.

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## 11-2 Review and Reinforcement

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### Solving Stoichiometry Problems

If the statement is true, write "true." If it is false, change the underlined word or words to make it true. Write your answer on the line provided.

- \_\_\_\_\_ 1. The major types of stoichiometry problems are mass-mass, mass-volume, and volume-volume.
- \_\_\_\_\_ 2. In a mass-mass problem, the coefficients in the balanced equation represent the actual numbers of moles of reactants and products.
- \_\_\_\_\_ 3. In solving a mass-mass problem, it is necessary to convert the given mass to volume.
- \_\_\_\_\_ 4. The molar volume of any gas at STP is 24.2 L.
- \_\_\_\_\_ 5. When the mass of a reactant is given, the number of moles can be found by dividing the mass by the reactant's molar mass.
- \_\_\_\_\_ 6. The coefficients in a chemical equation also represent the ratio of the mass of gases involved in the reaction.

Write the balanced equations for each of the following problems. Then solve the problems as directed. Show all your work.

7. When 9.8 g of aluminum oxide ( $\text{Al}_2\text{O}_3$ ) decomposes, how many grams of aluminum metal are produced?
8. How many grams of iodine are produced when 0.72 mol of fluorine react with potassium iodide (KI)?
9. How many grams of sodium are required to react with water to produce 5.0 g of sodium hydroxide? How many grams of  $\text{H}_2$  are produced? What volume would be occupied by the resulting hydrogen at STP?