

Ch. 3 (3-8) Stoichiometry

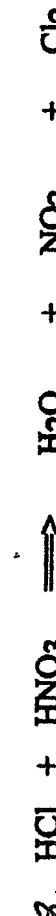
- calculations based on balanced equations.

When doing stoichiometry, you must start with a balanced equation. Then the steps are always the same!

Step 1 : Convert **to** moles of given substance A.

Step 2 : Convert **from** moles of given substance A **to** moles of desired substance B, by using the mole ratio of the balanced equation.

Step 3 : Convert **from** moles of the desired substance B.



*1. Example: How many grams of O₂ is produced from 50.0 grams H₂O decomposing according to the following reaction?



*2

1. **First** balance equation 5.

2. Find the number of moles of the given substance.

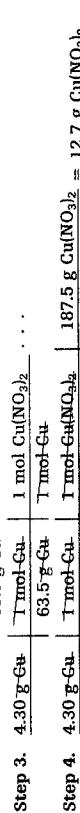
3. Inspect the balanced equation to determine the ratio of moles of required substance to moles of given substance.

4. Express the moles of required substance in terms of grams.

EXAMPLE: Mass-Mass

How many grams of copper(II) nitrate would be produced from 4.30 g of copper metal reacting with excess nitric acid?

Solving process:



1. When copper(II) nitrate reacts with sodium hydroxide, copper(II) hydroxide is produced. How many grams of Cu(OH)₂ can be prepared from 12.7 g of Cu(NO₃)₂ and excess NaOH?



2. When Cu(OH)₂ is heated, it decomposes to black CuO and H₂O. How many grams of CuO will be formed from the decomposition of 6.59 g of Cu(OH)₂?



3. When 5.37 g of the black copper(II) oxide are mixed with excess sulfuric acid, the solution turns a clear blue, indicating the formation of copper(II) sulfate. How many grams of copper metal will be recovered from the solution? (Hint: Zn + CuSO₄ → ZnSO₄ + Cu.)



4. If an excess of zinc metal is placed in a copper(II) sulfate solution, the zinc will displace the copper. If 10.8 g of copper(II) sulfate is reacted, how many grams of copper metal will be recovered from the solution?

