

Exercise 5: Stoichiometric calculations

All problems are based on the reaction of **magnesium chloride** with **sodium hydroxide**.

1. Predict the **products**.
2. Write a **balanced** chemical equation for the reaction.
3. Calculate the **percent composition** of all the elements in the magnesium-containing product.
4. How many **moles** of **each** product could be formed from 3.72 moles of sodium hydroxide?
5. How many **grams** of **each** product could be formed from 7.32 grams of magnesium chloride?

6. If the reaction is done with 3.72 moles of sodium hydroxide and from 7.32 grams of magnesium chloride, which is the **limiting reactant**?
7. What is the **theoretical yield** of the reaction with the quantities in question 6?
8. The balanced reaction is **endothermic** by 2.2 kJ/mole of magnesium chloride. How much **heat** energy is transferred with the reactant quantities in question 6?
9. Is the heat energy in question 8 **released** or **absorbed**?
10. If the reaction with the quantities in question 6 has a 97% yield, what is the **actual yield**?