

Stoichiometry of the Reaction between NaOH(aq) and CuSO₄(aq)

Today you will investigate the reaction between NaOH(aq) and CuSO₄(aq).

1. Here in the lab you have a 0.5 M NaOH(aq) solution. How would you make 20 mL of a 0.1 M NaOH(aq) solution from the 0.5 M NaOH(aq) solution? Show your calculations below, and once you have instructor approval go ahead and make the 0.1 M NaOH(aq) solution.
2. Here in the lab you have a 0.5 M CuSO₄(aq) solution. How would you make 20 mL of a 0.1 M CuSO₄(aq) solution from the 0.5 M CuSO₄(aq) solution? Show your calculations below, and once you have instructor approval go ahead and make the 0.1 M CuSO₄(aq) solution.
3. What is the chemical equation for the reaction between NaOH(aq) and CuSO₄(aq)? Include the physical states of the substances.
4. Transfer 5 mL of your 0.1 M CuSO₄(aq) solution into a test tube.
5. What color is your CuSO₄(aq) solution?
6. If you add some of the NaOH(aq) solution to the CuSO₄(aq) solution, what would you expect to see?

7. What volume of 0.1 M NaOH(aq) solution would be needed to completely react with the 5 mL of your 0.1 M CuSO₄(aq) solution in the test tube? Show your calculations below.
8. Using a pipet, add the volume of 0.1 M NaOH(aq) solution you calculated in step #7 above to the 5 mL of your 0.1 M CuSO₄(aq) solution in the test tube. What did you observe?
9. Did you completely react the CuSO₄ that was originally in the 5 mL of your 0.1 M CuSO₄(aq) solution in the test tube? If yes, explain why. If no, explain why not.
10. You can use equations involving molarity or concentration when you are thinking about dilutions and when you are thinking about reactions in aqueous solution.
- a. What is the equation you should use when you are thinking about dilutions?

 - b. What is the equation you should use when you are thinking about reactions in aqueous solution?
11. Where are CuSO₄ and NaOH used? CuSO₄ is an algacide and is used in aquaria, and NaOH is a base and is used as a cleaner.