

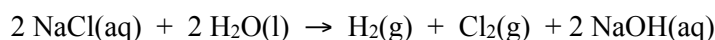
Molarity Practice

Solution Concentration

1. If 6.73 g of Na_2CO_3 is dissolved in enough water to make 250. mL of solution, what is the molarity of the sodium carbonate? What are the molar concentrations of the Na^+ and CO_3^{2-} ions?
2. Some potassium dichromate ($\text{K}_2\text{Cr}_2\text{O}_7$), 2.335 g, is dissolved in enough water to make exactly 500. mL of solution. What is the molarity of the potassium dichromate? What are the molar concentrations of the K^+ and $\text{Cr}_2\text{O}_7^{2-}$ ions?
4. What is the mass, in grams, of solute in 125 mL of a 1.023×10^{-3} M solution of Na_3PO_4 ? What are the molar concentrations of the Na^+ and PO_4^{3-} ions?
5. What volume of 2.06 M KMnO_4 , in Liters, contains 322 g of solute?
6. If 4.00 mL of 0.0250 M CuSO_4 is diluted to 10.0 mL with pure water, what is the molarity of copper(II) sulfate in the diluted solution?
7. If you dilute 25.0 mL of 1.50 M hydrochloric acid to 500. mL, what is the molar concentration of the dilute acid?
8. If you need 1.00 L of 0.125 M H_2SO_4 , which of the following methods would you use to prepare this solution?
 - a) Dilute 20.8 mL of 6.00 M H_2SO_4 to a volume of 1.00 L.
 - b) Add 950. mL of water to 50.0 mL of 3.00 M H_2SO_4 .
9. For each solution, identify the ions that exist in aqueous solution & specify the concentration of each.
 - a) 0.12 M BaCl_2
 - b) 0.0125 M CuSO_4
 - c) 0.146 M AlCl_3
 - d) 0.500 M $\text{K}_2\text{Cr}_2\text{O}_7$

Stoichiometry of Reactions in Solution

10. What volume of 0.125 M HNO_3 , in milliliters, is required to react completely with 1.30 g of $\text{Ba}(\text{OH})_2$?
$$2 \text{HNO}_3(\text{aq}) + \text{Ba}(\text{OH})_2(\text{s}) \rightarrow \text{Ba}(\text{NO}_3)_2(\text{aq}) + 2 \text{H}_2\text{O}(\text{l})$$
11. One of the most important industrial processes in our economy is the electrolysis of brine solutions (aqueous solutions of NaCl). When an electric current is passed through an aqueous solution of salt, the NaCl and water produce $\text{H}_2(\text{g})$, $\text{Cl}_2(\text{g})$, and NaOH —all valuable industrial chemicals.



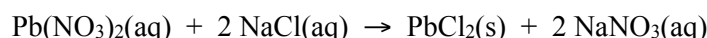
What mass of NaOH can be formed from 10.0 L of 0.15 M NaCl ? What mass of chlorine can be obtained?

12. In the photographic developing process, silver bromide is dissolved by adding sodium thiosulfate:



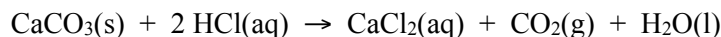
If you want to dissolve 0.250 g of AgBr , what volume of 0.0138 M $\text{Na}_2\text{S}_2\text{O}_3$, in milliliters, should be used?

13. What volume of 0.750 M $\text{Pb}(\text{NO}_3)_2$, in milliliters, is required to react completely with 1.00 L of 2.25 M NaCl solution? The balanced equation is



Also, how much of each ion is left?

14. You place 2.56 g of CaCO_3 in a beaker containing 250. mL of 0.125 M HCl . When the reaction has ceased,



does any calcium carbonate remain? Explain your reasoning. What mass of CaCl_2 can be produced?