

## Molarity Practice Problems

- How many grams of potassium carbonate are needed to make 200 mL of a 2.50 M solution?
- How many liters of 4.00 M solution can be made using 100 grams of lithium bromide?
- What is the concentration of a 450 mL solution that contains 200 grams of iron (II) chloride?
- How many grams of ammonium sulfate are needed to make a 0.250 L solution at a concentration of 6 M?
- What is the concentration of a solution that has a volume of 2.50 L and contains 660 grams of calcium phosphate?
- How many grams of copper (II) fluoride are needed to make 6.70 liters of a 1.20 M solution?
- How many liters of 0.880 M solution can be made with 25.5 grams of lithium fluoride?
- What is the concentration of a solution that with a volume of 660 mL that contains 33.4 grams of aluminum acetate?
- How many liters of 0.7750 M solution can be made using 75.0 grams of lead (II) oxide?
- How many grams of manganese (IV) oxide are needed to make 5.60 liters of a 2.10 M solution?
- What is the concentration of a solution with a volume of 9.00 mL that contains 2.00 grams of iron (III) hydroxide?
- How many liters of 3.40 M solution can be made using 78.0 grams of isopropanol ( $C_3H_8O$ )?
- What is the concentration of a solution with a volume of 3.30 mL that contains 12.0 grams of ammonium sulfite?

### Answers:

- 69.1 g
- 816 g
- 2.08 M
- 0.288 L
- 1.12 L
- 0.382 L
- 3.51M
- 0.250 M
- 31.2 M
- 198.3 g
- 0.448 L
- 0.850 M
- 1022.4 g

## Stoichiometry

- $H_2SO_4$  reacts with NaOH, producing water and sodium sulfate. What volume of 2.0 M  $H_2SO_4$  will be required to react completely with 75 mL of 0.50 mol/L NaOH? **9.4 mL**
- How many moles of  $Fe(OH)_3$  are produced when 85.0 L of iron(III) sulfate at a concentration of 0.600 mol/L reacts with excess NaOH? **102 mol**
- What mass of precipitate will be produced from the reaction of 50.0 mL of 2.50 mol/L sodium hydroxide with an excess of zinc chloride solution. **6.21 g**
- a) What volume of 0.20 mol/L  $AgNO_3$  will be needed to react completely with 25.0 mL of 0.50 mol/L potassium phosphate? **0.19 L**  
b) What mass of precipitate is produced from the above reaction? **5.2 g**
- A strip of zinc metal was placed in a beaker that contained 120mL of a solution of copper (II) nitrate,  $Cu(NO_3)_2$  (aq). The mass of the copper produced was 0.813g. Find the initial concentration of the solution of copper (II) nitrate. **0.11 mol/L**
- What mass of strontium carbonate can be precipitated from 50.0mL of 0.165mol/L strontium nitrate solution by adding excess sodium carbonate solution? **1.22g**
- Vinegar is an aqueous solution of acetic acid,  $CH_3COOH$  (aq). What volume of 1.07 mol/L aqueous sodium hydroxide will completely react with 25.0mL of 0.833mol/L household vinegar? **19.5mL**
- Before toothpaste was invented, people sometimes used calcium carbonate to clean their teeth. What mass of calcium carbonate can be precipitated by reaction 80.0mL of a 0.100mol/L solution of sodium carbonate with 50.0mL of a 0.100mol/L solution of calcium chloride? **0.500g**
- Silver chromate is a brick-red insoluble substance that is used to stain neurons so they can be viewed under a microscope. Silver chromate can be formed by the reaction between silver nitrate and potassium chromate. Calculate the mass of silver chromate that forms when 25.0mL of 0.125mol/L silver nitrate reacts with 20.0mL of 0.150 sodium chromate. **0.518g**
- A kidney stone is a hard mass that can form in the kidneys or urinary tract. The most common type of kidney stone contains primarily calcium oxalate,  $CaC_2O_4$  (s). A chemist wants to react 60.0mL of 0.135 mol/L sodium oxalate,  $Na_2C_2O_4$  (aq), with 0.226 mol/L calcium chloride, to precipitate calcium oxalate. What minimum volume of calcium chloride solution required? What mass of calcium oxalate will be precipitated? **35.8mL, 1.04g**
- What is the minimum volume of 0.220 mol/L calcium chloride that is needed to precipitate all the silver ions in 100mL of 0.166 mol/L silver nitrate? **42mL**
- Mixing solutions of sodium hydroxide and rubidium nitrate will cause rubidium hydroxide to precipitate. You have a 1.50 mol/L sodium hydroxide solution and a 0.200mol/L rubidium nitrate solution. What volume of each solution should be mixed together to form 15.0g of rubidium hydroxide? **NaOH 97.3 mL and  $RbNO_3$  730 mL**