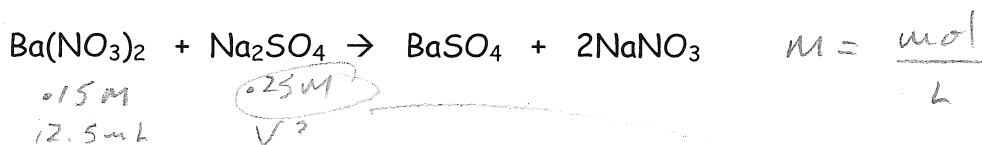


Solutions Stoichiometry

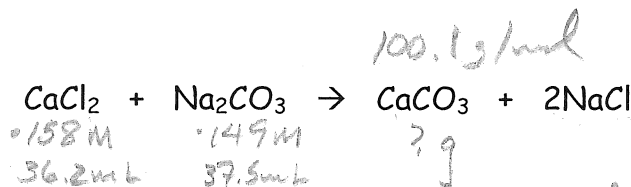
1. What volume (in mL) of 0.25 M Na_2SO_4 solution is needed to precipitate all the barium, as $\text{BaSO}_4(\text{s})$ from 12.5 mL of 0.15 M $\text{Ba}(\text{NO}_3)_2$ solution?

$$1 \text{ L} = 1000 \text{ mL}$$



0.15 mol BaNO_3	12.5 mL	1 L	$1 \text{ mol Na}_2\text{SO}_4$	1 L	$= 0.0075 \text{ L}$ or 7.5 mL $0.25 \text{ M Na}_2\text{SO}_4$
$\frac{0.15 \text{ mol BaNO}_3}{1 \text{ L}}$	$\frac{12.5 \text{ mL}}{1000 \text{ mL}}$	$\frac{1 \text{ L}}{1 \text{ mol BaNO}_3}$	$\frac{1 \text{ mol Na}_2\text{SO}_4}{0.25 \text{ mol}}$	$\frac{1 \text{ L}}{1 \text{ mol Na}_2\text{SO}_4}$	

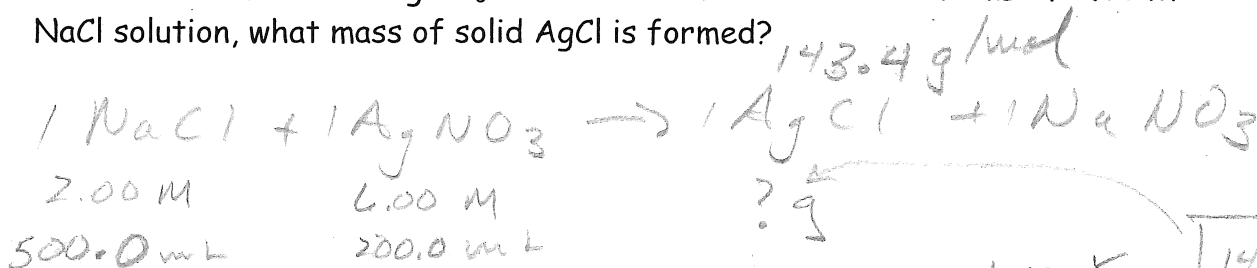
2. If 36.2 mL of 0.158 M CaCl_2 solution is added to 37.5 mL of 0.149 M Na_2CO_3 , what mass of calcium carbonate, CaCO_3 , will be precipitated? The reaction is ...



0.158 mol CaCl_2	36.2 mL	1 L	1 CaCO_3	$= 0.005719 \text{ mol}$ $\times 100.1 \text{ g/mol}$ $= 0.559 \text{ g}$
$\frac{0.158 \text{ mol CaCl}_2}{1 \text{ L}}$	$\frac{36.2 \text{ mL}}{1000 \text{ mL}}$	$\frac{1 \text{ L}}{1 \text{ mol CaCl}_2}$	$\frac{1 \text{ mol CaCO}_3}{100.1 \text{ g}}$	

$0.149 \text{ mol Na}_2\text{CO}_3$	37.5 mL	1 L	1 mol CaCO_3	$= 0.0055875 \text{ mol}$ $\times 100.1 \text{ g/mol}$ $= 0.559 \text{ g}$
$\frac{0.149 \text{ mol Na}_2\text{CO}_3}{1 \text{ L}}$	$\frac{37.5 \text{ mL}}{1000 \text{ mL}}$	$\frac{1 \text{ L}}{1 \text{ mol Na}_2\text{CO}_3}$	$\frac{1 \text{ mol CaCO}_3}{100.1 \text{ g}}$	

3. If 200.0 mL of 6.00 M AgNO_3 solution is combined with 500.0 mL of 2.00 M NaCl solution, what mass of solid AgCl is formed?

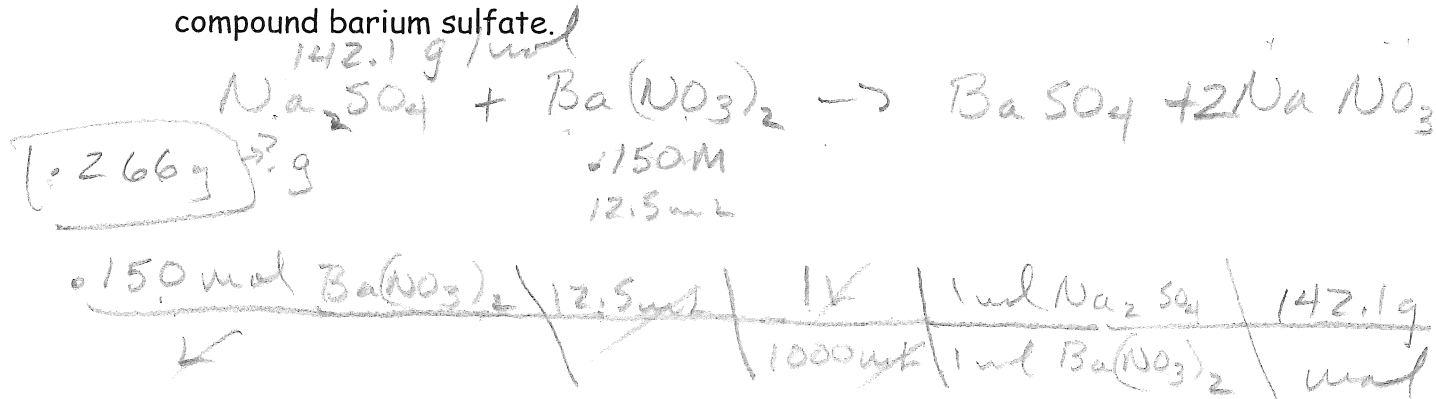


2.00 mol NaCl	500.0 mL	1 L	1 mol AgCl	143.4 g
$\frac{2.00 \text{ mol NaCl}}{1 \text{ L}}$	$\frac{500.0 \text{ mL}}{1000 \text{ mL}}$	$\frac{1 \text{ L}}{1 \text{ mol NaCl}}$	$\frac{1 \text{ mol AgCl}}{1 \text{ mol NaCl}}$	$\frac{143.4 \text{ g}}{1 \text{ mol AgCl}}$

6.00 mol AgNO_3	200.0 mL	1 L	1 mol AgCl	143.4 g
$\frac{6.00 \text{ mol AgNO}_3}{1 \text{ L}}$	$\frac{200.0 \text{ mL}}{1000 \text{ mL}}$	$\frac{1 \text{ L}}{1 \text{ mol AgNO}_3}$	$\frac{1 \text{ mol AgCl}}{1 \text{ mol AgNO}_3}$	$\frac{143.4 \text{ g}}{1 \text{ mol AgCl}}$

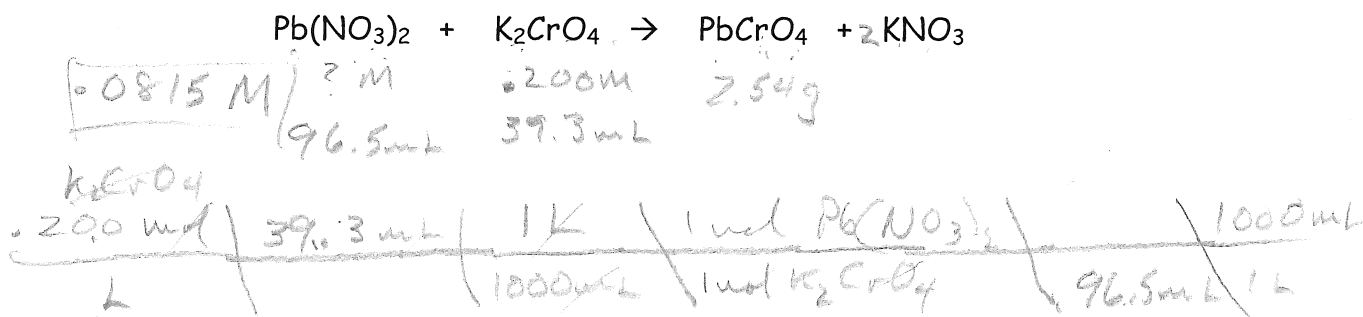
SAME Reaction as #1

4. What mass (in grams) of solid sodium sulfate would need to be added to 12.5 mL of 0.150 M barium nitrate solution to precipitate all of the barium as the compound barium sulfate.



5. When a solution of lead (II) nitrate reacts with a potassium chromate solution a solid product, lead (II) chromate, forms according to the equation below.

If 2.54 g of PbCrO₄ forms from the mixing of 39.3 mL of 0.200 M K₂CrO₄ and 96.5 mL of the lead (II) nitrate solution, calculate the molarity of the lead (II) nitrate solution (assume both reactants will run-out simultaneously).



6. How many grams of Ba(NO₃)₂ are required to precipitate all the sulfate ion present in 15.3 mL of 0.139 M sulfuric acid solution?

