

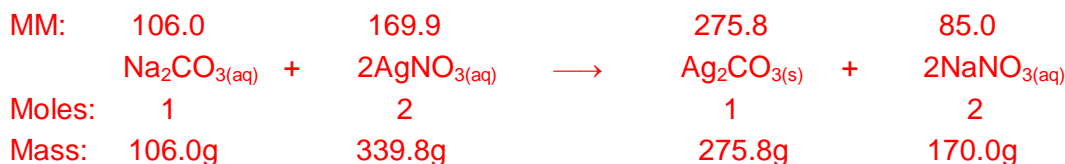
Stoichiometry – Limiting Reactant Example Problem Solution

Solutions of sodium carbonate and silver (I) nitrate react to form solid silver (I) carbonate and a solution of sodium nitrate.

a) Write and balance the chemical equation of the reaction that occurs.

b) A solution containing 25.0 g of sodium carbonate is mixed with one containing 25.0 g of silver (I) nitrate. How many grams of sodium carbonate, silver (I) nitrate, silver (I) carbonate, and of sodium nitrate are present when the reaction is complete?

Note: Use AMs with at least 1 decimal for this problem.



Initial moles present:

25.0 g Na_2CO_3	1 mol	= 0.236 mol Na_2CO_3
	106.0 g	
25.0 g AgNO_3	1 mol	= 0.147 mol AgNO_3
	169.9 g	

Then the initial stoichiometric amounts are:

For Na_2CO_3

0.236	= 0.236
1	

For AgNO_3

0.147	= 0.0735
2	

So, the limiting reactant is AgNO_3 . This means that all of the initial AgNO_3 will be consumed in the reaction, and all other substances will react in their stoichiometric ratios:

25.0 g AgNO_3	106.0 g Na_2CO_3	= 7.80 g Na_2CO_3 are consumed
	339.8 g AgNO_3	

25.0 g AgNO_3	275.8 g Ag_2CO_3	= 20.3 g Ag_2CO_3 are produced
	339.8 g AgNO_3	

25.0 g AgNO_3	170.0 g NaNO_3	= 12.5 g NaNO_3 are produced
	339.8 g AgNO_3	

Then, the ICE table:

	$\text{Na}_2\text{CO}_{3(\text{aq})}$	+	$2\text{AgNO}_{3(\text{aq})}$	\longrightarrow	$\text{Ag}_2\text{CO}_{3(\text{s})}$	+	$2\text{NaNO}_{3(\text{aq})}$
Initial	25.0 g		25.0 g		0		0
Change	-7.8 g		-25.0 g		+20.3 g		+12.5 g
End	17.2 g		0.0 g		20.3 g		12.5 g

Note that initial mass: 25.0 g + 25.0 g = 50.0 g

Final mass: 17.2 g + 20.3 g + 12.5 g = 50.0 g