

Chem 7 WB

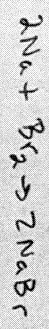
11-29-17

25 Calc mass H_2SO_4 needed to react with

15.2g of Al by:

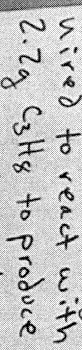


26 1.8 mole Na reacts with bromine:

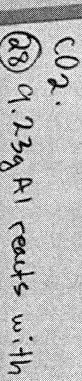


Calc mass $NaBr$.

27 Calc mass O_2 required to react with

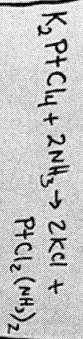


28 9.23g Al reacts with HCl :



Calc mass H_2 produced.

29 Given:

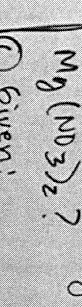


2.5g K_2PtCl_4 reacts. Find mass $PtCl_2(NH_3)_2$ and NH_3 .

Start here 2

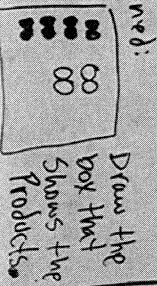
3 How many grams of Nb_3 are in 1g $Mg(Nb_3)_2$?

4 Given:



The following ratio of reactants was combined:

Draw the box that shows the products.



7 Name:

PO_4^{3-} , MnO_4^- , CO_3^{2-} , SO_4^{2-} , $C_2O_4^{2-}$, CrO_4^{2-} , OH^-

8 Write the outer valence EC for Cl^-

9 Name $MgSO_4$, $FeCl_3$, Na_2PO_4 , $V(Nb_3)_2$, $BeSO_4$

10 which sample contains more particles?

26g Cr or 12.04g C

11 which sample contains more particles?

34g O or 34g F

12 select the larger atom: C, F

13 Rank, using words and arrows the following atoms in increasing ionization energy:

Cl, Ar, Si, Al, S

14 Select the larger atom: Cu, V

15 Select the pair of atoms closest in size:

Kr, Ga, Ni, Br

16 Calc mass $Mg(OH)_2$ that reacts with 1.2g HCl

17 Calc mass NH_4Cl that forms when 3.47g NH_3 reacts with HCl by $NH_3 + HCl \rightarrow NH_4Cl$

18 1.44g of Na is combusted with oxygen to produce sodium oxide. Calc mass sodium oxide formed.

19 which element has the higher 1st ionization energy?

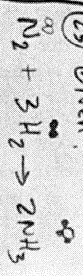
O or Ne

20 Calc molar mass: $CaCO_3 \cdot 6H_2O$

21 Calc the atoms in 10 molecules of $C_6H_8O_6$

22 Calc mass of Cr in 2 moles $Na_2Cr_2O_7$

23 Given:

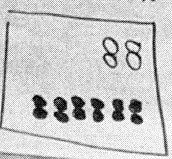


The following ratio of reactants are combined:

Draw the box that shows the theoretical yield.

24 20g bromine reacts with an excess of aluminum metal to produce aluminum bromide.

a) Calc the yield in mass of $AlBr_3$.



$\text{Mg}(\overset{\text{O}}{\underset{\uparrow}{\text{N}}}\text{O}_3)_2 \rightarrow \text{Mg}^{2+} + 2\text{NO}_3^-$ (calc mass NO_3^- in 1g $\text{Mg}(\text{NO}_3)_2$.

$(62.01)2 = 124.02 + 24.31 = 148.33$

$1\text{g Mg}(\text{NO}_3)_2 \times \frac{1\text{mole}}{148.33\text{g}} = 0.0067\text{mole Mg}(\text{NO}_3)_2 \times \frac{6.022 \times 10^{23} \text{ f. units}}{1\text{mole}} = 4.06 \times 10^{21} \text{ f. units}$

How many moles NO_3^- are in 1g $\text{Mg}(\text{NO}_3)_2$?

$0.0067\text{mole Mg}(\text{NO}_3)_2 \times \frac{2\text{mole NO}_3^-}{1\text{mole Mg}(\text{NO}_3)_2} = 0.0134\text{mole NO}_3^-$

How many grams of NO_3^- are in 1g $\text{Mg}(\text{NO}_3)_2$?

$0.0134\text{mole NO}_3^- \times \frac{62.01\text{g}}{1\text{mole}} = 0.831\text{g NO}_3^-$

find % mass all atoms.
 MgSO_4
 $(16)(4)$
 120.38 Mm

$\% \text{Mg} = \frac{24.31}{120.38} \times 100 = 20.19$
 20.2

$\% \text{S} = \frac{32.07}{120.38} \times 100 = 26.64$

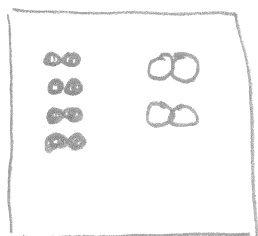
$\% \text{O} = \frac{(16)(4)}{120.38} \times 100 = 53.16$

% mass composition
 $\% \text{mass} = \frac{(\text{Mm})(x)}{\text{Mm compound}} \times 100$

Given:



The following reactants
are mixed:



Draw box
that represents
products



14 Name 7

10. Write the formula including charge for the following polyanions or molecular ions:

phosphate	PO_4^{-3}
phosphite	
permanganate	MnO_4^-
carbonate	CO_3^{-2}
sulfate	SO_4^{-2}
sulfite	
hypochlorite	
dichromate	$\text{Cr}_2\text{O}_7^{-2}$
chromate	CrO_4^{-2}
hydroxide	OH^-
percarbonate	
cyanide	

Formula + name

PO_4^{-3} = phosphate

SO_4^{-2} = sulfate

NO_3^- = nitrate

CO_3^{-2} = carbonate

OH^- = hydroxide

NH_4^+ = ammonium

15 8

11. Write the EC for:

$\text{S}^{-2}, \text{Cl}^-, \text{K}^+, \text{Mg}^{+2}, \text{N}^{-3}$
 $\underbrace{\hspace{1cm}}_{3s^2 3p^6} \quad \underbrace{\hspace{1cm}}_{2s^2 2p^6}$

12 Calculate the number of e^- in:

10 N^{-3}

18 P^{-3}

10 O^{-2}

18 S^{-2}

Na^+ 10

K^+ 18

Mg^{+2} 10

Ca^{+2} 18

~~24~~ write the formula ~~24~~

magnesium ~~hydrogen~~ sulfate MgSO_4

9 iron (III) chloride FeCl_3

sodium phosphate Na_3PO_4

vanadium (II) nitrate $\text{V}(\text{NO}_3)_2$

beryllium sulfate BeSO_4

nickel (II) bromide NiBr_2

~~4~~ ~~47~~ ~~25~~ ~~10~~
14 which element contains more particles, ⁵²26g Cr or 12.01g C?

~~7~~ ~~48~~ ~~26~~ ~~11~~
C

~~14~~ ~~48~~ ~~26~~ ~~11~~
14 which element contains more particles, 32g O or 38g F?

Niether / or equal

~~11~~ ~~12~~ ~~13~~ Select the larger atom 12

~~14~~ ~~15~~ C, F

~~16~~ ~~17~~ rank the following atoms in order
~~18~~ of increasing ionization energy
~~19~~ using arrows and words.

~~20~~ Cl, Ar, Si, Al, S 13

less $\longrightarrow$ more

Al Si S Cl Ar

~~21~~ ~~22~~ ~~23~~ select the large atom

~~24~~ Cu, V 14

~~25~~ ~~26~~ ~~27~~ select the pair of atoms
closest in size.

~~28~~ Kr, Ga, Ni, Br

15

Kr Br

What mass of $\text{Mg}(\text{OH})_2$ will react with 1.2g HCl?



$$1.2\text{g HCl} \times \frac{1\text{mole HCl}}{36.5\text{g HCl}} \times \frac{1\text{Mg}(\text{OH})_2}{2\text{HCl}} \times \frac{58.3\text{g Mg}(\text{OH})_2}{1\text{mole}} = 0.958\text{g Mg}(\text{OH})_2$$

7.87g NH_3 reacts with HCl to produce ammonium chloride:



Calc mass NH_4Cl ,

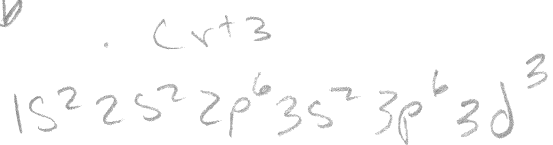
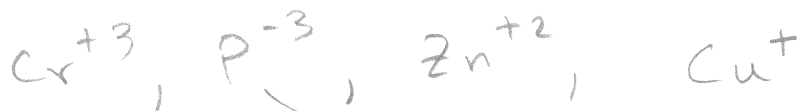
$$7.87\text{g NH}_3 \times \frac{1\text{mole}}{17\text{g}} \times \frac{1\text{NH}_4\text{Cl}}{1\text{NH}_3} \times \frac{53.5\text{g NH}_4\text{Cl}}{1\text{mole}} = 24.7\text{g NH}_4\text{Cl}$$

1.44g of sodium is combined with oxygen to form sodium oxide: $4\text{Na} + \text{O}_2 \rightarrow 2\text{Na}_2\text{O}$

Calc mass Na_2O ,

$$1.44\text{g Na} \times \frac{1\text{mole}}{23\text{g Na}} \times \frac{2\text{Na}_2\text{O}}{4\text{Na}} \times \frac{62\text{g Na}_2\text{O}}{1\text{mole}} = 1.94\text{g Na}_2\text{O}$$

③ Write E_c for



~~18~~ 19

which elements in following pairs
have higher 1st ionization

O, Ne

Mg, Sr

K, Cr

Br, Sb

Ga, Ge

Chem 7 white Board

Naming



Silicon tetrachloride

K_2O_2
potassium peroxide

MnS
manganese (II) sulfide

lead (II) sulfide PbS

mass 5-3-10

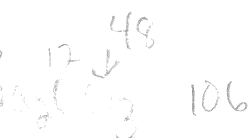


Sodium carbonate



mass 5-3-10

mass 5-3-10



% mass (continued)

Calculate mass of C in 5g Na_2CO_3 .

0.565g

How many atoms of C in 10 molecules of $C_6H_{12}O_6$?

60 atoms C

How many moles of Cr in 2 moles of $Na_2Cr_2O_7$?

4 moles Cr

14 moles O

4 moles Na

mass 5-3-10 molecules in



mass 5-3-31-10-21



~~106~~ ~~28~~ ~~17~~
Lewis dot formula for:



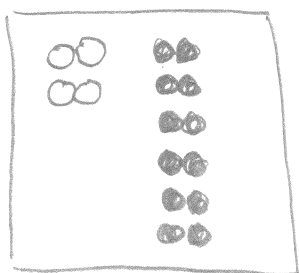
~~14~~ ~~107~~ ~~19~~ ~~53~~
Given:



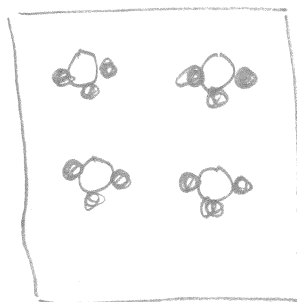
~~7~~ ~~10~~ 23

The following reactants are

~~18~~ combined:



Draw the box that represents the products.



~~40~~ ~~41~~ ~~42~~ ~~43~~ ~~44~~ ~~45~~ ~~46~~ ~~47~~ ~~48~~ ~~49~~ ~~50~~ ~~51~~ ~~52~~ ~~53~~ ~~54~~ ~~55~~ ~~56~~ ~~57~~ ~~58~~ ~~59~~ ~~60~~ ~~61~~ ~~62~~ ~~63~~ ~~64~~ ~~65~~ ~~66~~ ~~67~~ ~~68~~ ~~69~~ ~~70~~ ~~71~~ ~~72~~ ~~73~~ ~~74~~ ~~75~~ ~~76~~ ~~77~~ ~~78~~ ~~79~~ ~~80~~ ~~81~~ ~~82~~ ~~83~~ ~~84~~ ~~85~~ ~~86~~ ~~87~~ ~~88~~ ~~89~~ ~~90~~ ~~91~~ ~~92~~ ~~93~~ ~~94~~ ~~95~~ ~~96~~ ~~97~~ ~~98~~ ~~99~~ ~~100~~ 24

20g of bromine is reacted with an excess of aluminum metal to produce aluminum bromide.

a. write bal. eq.



b. Calc. theoretical yield of AlBr_3 :

$$\begin{aligned}\frac{20\text{g}}{159.8} &= 0.125 \text{ moles Br}_2 \times \frac{2\text{AlBr}_3}{3\text{Br}_2} = \\ &= 0.0835 \text{ moles AlBr}_3 \times 266.68 = \\ &= \underline{22.3\text{g AlBr}_3}\end{aligned}$$

c. If $\Delta H = -760 \text{ KJ}$ for the rxn
Calc. ΔH releases when 20g Br_2
reacted.

$$\begin{aligned}\frac{-760 \text{ KJ}}{3\text{Br}_2} &= \frac{253 \text{ KJ}}{\text{mole Br}_2} \times 0.125 \text{ moles Br}_2 = \\ &= \underline{-31.66 \text{ KJ}}\end{aligned}$$

d. The rxn is endo or exo?

~~14~~ ~~8~~ 25

Calculate the mass H_2SO_4 required to

~~14~~ dissolve 15.2g of Al by:



$$15.2\text{g Al} \times \frac{1\text{mole}}{26.98\text{g Al}} \times \frac{3\text{H}_2\text{SO}_4}{2\text{Al}} \times \frac{98.09\text{g H}_2\text{SO}_4}{\text{mole}} = 82.9\text{g H}_2\text{SO}_4$$

↑
0.5634 mole Al

↑
0.8451 mole H_2SO_4

~~15~~ ~~31~~ ~~26~~



1.8mole 1.4mole

Find L.R

$$\text{1.8mole Na} \times \frac{2\text{NaBr}}{2\text{Na}} = 1.8\text{mole NaBr}$$

L.R

$$1.4\text{mole Br}_2 \times \frac{2\text{NaBr}}{1\text{Br}_2} = 2.8\text{mole NaBr}$$

~~16~~ ~~32~~ ~~17~~



16mole 13mole

Find L.R

$$\text{16mole Al} \times \frac{2\text{Al}_2\text{O}_3}{4\text{Al}} = 8\text{mole Al}_2\text{O}_3$$

L.R

$$13\text{mole O}_2 \times \frac{2\text{Al}_2\text{O}_3}{3\text{O}_2} = 8.66\text{mole Al}_2\text{O}_3$$

27

Calc moles O_2 required to combust
2.2g C_3H_8 to CO_2 and H_2O .

a) balanced eq

b) Calc moles O_2

c) Calc mass CO_2 produced.



$$2.2g C_3H_8 \times \frac{1 \text{ mole}}{44g} = 0.05 \text{ mole } C_3H_8 \times \frac{5 O_2}{1 C_3H_8} = 0.25 \text{ mole } O_2$$

$$0.05 \text{ mole } C_3H_8 \times \frac{3 CO_2}{1 C_3H_8} = 0.15 \text{ mole } CO_2$$

$$\times 44 = 6.6g CO_2$$

Calc grams oxygen in 1g CO_2 .

$$1g CO_2 \times \frac{1 \text{ mole}}{44g CO_2} = 0.023 \text{ mole } CO_2 \times \frac{20}{1 CO_2} =$$

$$= 0.0455 \text{ mole } O \times \frac{16g O}{\text{mole}} = 0.727g O$$

28

9.23g Al reacts with HCl by:



Calc mass hydrogen produced.

$$9.23\text{g Al} \times \frac{1\text{mole}}{27\text{g Al}} \times \frac{3\text{H}_2}{2\text{Al}} \times \frac{2.016\text{g H}_2}{1\text{mole}} = 1.04\text{g H}_2$$

29

Given: $\text{K}_2\text{PtCl}_4 + 2\text{NH}_3 \rightarrow 2\text{KCl} + \text{PtCl}_2(\text{NH}_3)_2$

Calc $\text{PtCl}_2(\text{NH}_3)_2$ is produced from

2.5g K_2PtCl_4 . How much mass NH_3 needed?

$$2.5\text{g K}_2\text{PtCl}_4 \times \frac{1\text{mole}}{415\text{g K}_2\text{PtCl}_4} \times \frac{1\text{ PtCl}_2(\text{NH}_3)_2}{1\text{K}_2\text{PtCl}_4}$$

$$2.5\text{g K}_2\text{PtCl}_4 \times \frac{1\text{mole}}{415\text{g}} \times \frac{2\text{NH}_3}{1\text{K}_2\text{PtCl}_4} \times \frac{300\text{g PtCl}_2(\text{NH}_3)_2}{1\text{mole}} =$$

$$\times \frac{17\text{g NH}_3}{1\text{mole}} = 0.205\text{g NH}_3$$

$$= 1.81\text{g PtCl}_2(\text{NH}_3)_2$$