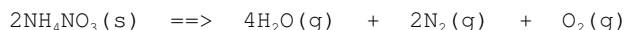


STOICHIOMETRIC PROBLEMS

SHEET #5

- Coal from a certain mine contains 2.8 % S. When the coal is burned at a power generating station, the sulphur is converted to $\text{SO}_2(\text{g})$. The $\text{SO}_2(\text{g})$ is then reacted at the plant with $\text{CaO}(\text{s})$ to form $\text{CaSO}_3(\text{s})$. If 1200 tonne of coal is burned at the power plant each day, what is the daily output of $\text{CaSO}_3(\text{s})$?
- Copper metal reacts with silver nitrate solution to form silver and copper (ii) nitrate. Calculate the mass of silver formed when 158 g of copper reacts.
- A 12.0 g sample of ammonium nitrate is exploded. What is the total volume of gas produced at 745 torr and 527 °C? The reaction is:



- Calcium carbonate under goes thermal decomposition according to the equation:

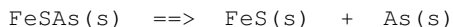


When an impure sample of $\text{CaCO}_3(\text{s})$, with a mass of 500 g, was completely decomposed, the residue had a mass of 300 g. What was the percentage of $\text{CaCO}_3(\text{s})$ in the original sample? Hint: use the mass of $\text{CO}_2(\text{g})$ to figure out the mass of $\text{CaCO}_3(\text{s})$ in the original sample.

- What mass of $\text{CO}_2(\text{g})$ is released when a 50.0 g sample of $\text{Na}_2\text{CO}_3(\text{s})$ with a 60.0 % purity react completely with HCl according to the following equation.

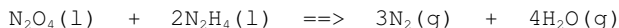


- Iron (III) oxide reacts with carbon monoxide to produce iron and carbon dioxide. How many kilograms of iron can be produced by 1.00 t of iron (III) oxide)?
- The most common ore of arsenic (mispickel) can be heated to produce arsenic:



How many kilograms of mispickel are required to produce one kilogram of arsenic?

- The following reaction between nitrogen tetroxide and hydrazine is used in rocket engines:



If 25.0 t of nitrogen tetroxide is carried in one tank, what mass of hydrazine should be carried in the other tank?

- Answers:
- | | |
|------------------------------------|---|
| 1. 126 t $\text{CaCO}_3(\text{s})$ | 5. 12.5 g $\text{CO}_2(\text{g})$ |
| 2. 537 g Ag(s) | 6. 698 kg Fe(s) |
| 3. 35.1 L gas | 7. 2.17 kg FeSAs(s) |
| 4. 91.0 % | 8. 17.39 t $\text{N}_2\text{H}_4(\text{l})$ |