
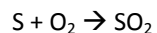


1. There are five characteristics of the Dalton model. List only 3.

Any of these five:

1. Matter is made up of small, indivisible particles called atoms.
2. All the atoms of a single element are identical.

3. The atoms of one element are different from the atoms of another element.
4. Compounds can form by bonding atoms of different elements in different ratios.
5. Chemical reactions create new substances but atoms are not destroyed.

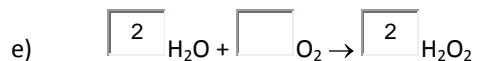
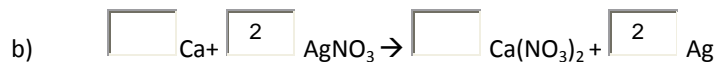
2. When some sulfur(S) burned, it reacted with 64 grams of oxygen gas. If 128 g of SO₂ were made, how many grams of S reacted? Show work.



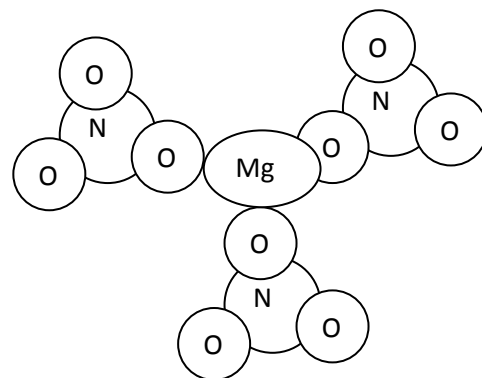
$$X + 64 = 128$$

$$X = 128 - 64 = 64 \text{ g}$$

3. Balance the following:



4. Write a formula for the compound shown here: Mg(NO₃)₃



5. TRUE? Or False?

- a) Since only carbon dioxide can make limewater cloudy, we consider it a characteristic property of the gas. **TRUE**
- b) A chemical property of water is that it reacts with sodium. **TRUE**
- c) A physical property of liquid oxygen is that it has a bluish colour. **TRUE**
- d) When paint dries, strangely its mass actually increases. Based on this the drying of paint is a chemical change. **TRUE**

6. Glass is mostly SiO_2 , a major component of sand. But if glassmakers used pure SiO_2 , glass' melting point would be too high. So they add Na_2CO_3 to make it easier to melt the mixture and work with the glass. But the problem is that the addition of sodium carbonate makes glass water soluble. To correct this problem, lime (CaO) is added. To make laboratory-type glass which is heat-resistant, B_2O_3 with Na_2O and K_2O is used instead of sodium carbonate.

- a) Notice that every compound used in glassmaking contains oxygen. Draw a Bohr-Rutherford model of neutral oxygen.

(8p) 2e) 6e

- b) Draw a Lewis structure for oxygen.



- c) Before sodium reacts with oxygen, sodium is a soft metal. What does it tell you about sodium's melting point?

It's low.

- d) Of all the materials used in glassmaking, two contain metalloids when they are not part of compounds. List them.



- e) How do **these** elements differ from metals? Give one physical difference and one chemical difference.

Metalloids do not react with acid. Metals do.

Metalloids are semi-conductors; metals usually conduct well

- f) List the elements that are in the same period as Si and Na.

Mg, Al, P, S, Cl, Ar

- g) List the elements that are in the same family as B.

Al, Ga, In, Tl

- h) Draw a Thomson model of the boron atom.

