

Practical work N°1

Exercise 1 :

- How many atoms are there in each of following
(a) 52 moles of Ar, (b) 3.75 moles of silver, (c) 48g of Mg (d) 52 u of He (e) 158 kg of phosphorus.
- What is the amount, in moles, of each of the following?
(a) 449 g of potassium (b) 11.8 g of Ar (c) 2.16×10^{24} atoms of Fe (d) 10.2×10^{30} molecules of O_2
- What is the mass of each of the following?
(a) 1.9×10^{24} atoms of Pb (in g) (b) 4.87×10^{25} atoms of Zn (in kg) (c) 2.33×10^{20} atoms of oxygen (in mg)

Molare mass : (Ar= 39.95g/mol ; Ag =107.87g/mol ; Mg= 24.31g/mol ; He= 4g/mol ; P= 30.97g/mol ; Pb =207.2g/mol ; Zn= 65.38g/mol ; O= 16g/mol)

- Suppose that you could decompose 0.250 mol of Ag_2S into its elements.
 - How many moles of silver would you have? How many moles of sulfur would you have?
 - How many moles of Ag_2S are there in 38.8 g of Ag_2S ? How many moles of silver and sulfur would be produced from this amount of Ag_2S ?
 - Calculate the masses of silver and sulfur produced in (b).

Exesice 2 :

- A sample of compound A (a clear, colorless gas) is analyzed and found to contain 4.27 g carbon and 5.69 g oxygen. A sample of compound B (also a clear, colorless gas) is analyzed and found to contain 5.19 g carbon and 13.84 g oxygen. Are these data an example of the law of definite proportions, the law of multiple proportions, or neither? What do these data tell you about substances A and B?
- When 1.375 g of cupric oxide is reduced on heating in a current of hydrogen, the weight of copper remaining 1.098 g. In another experiment, 1.179 g of copper is dissolved in nitric acid and resulting copper nitrate converted into cupric oxide by ignition. The weight of cupric oxide formed is 1.476 g. Show that these results illustrate the law of constant proportion.

Exercise3 :

1. Given the number of protons, neutrons, and electrons, what would be the mass number and the charge number of each isotope? What would be the atomic number? The identity of the element?

g) 7 protons, 7 neutrons, 10 electrons

h) 15 protons, 16 neutrons, 15 electrons

i) 25 protons, 30 neutrons, 23 electrons

2. In a sample of 400 lithium atoms, it is found that 30 atoms are lithium-6 (6.015 g/mol) and 370 atoms are lithium-7 (7.016 g/mol). Calculate the average atomic mass of lithium.

3. Boron exists in two isotopes, boron-10 and boron-11. Based on the atomic mass (10.81g/mol), which isotope should be more abundant?

4. Calculate the average atomic weight for magnesium:

mass number	exact weight	percent abundance
24	23.985042	78.99
25	24.985837	x
26	25.982593	y

Excercise 4 :

1. Oxygen has an unstable isotope O-17 that has a mass of 17.00454. If the mass of a neutron is 1.00898 u and the mass of a proton is 1.00814 u, calculate :

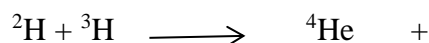
a) The mass defect?

b) The binding energy of the nucleus in joules and in Mev?

c) The binding energy per nucleu in joules and in Mev?

d) The binding energy of the nucleu for one mole in joules and in Mev?

2. The fusion reaction below is one of the final stages in the fusion process that occurs in the Sun.



(a) Complete the reaction identifying the missing particle.

(b) Calculate the energy released in the fusion reaction using the following information (you will also need the mass of the other particle).

$${}^2\text{H} = 3.345 \times 10^{-27} \text{ Kg} ; {}^3\text{H} = 5.008 \times 10^{-27} \text{ Kg} ; {}^4\text{He} 6.647 \times 10^{-27} \text{ Kg}$$

