The tutorial serie 1

Dr BENOMARA Amina married name BENDIMERAD

Assistant Professor at the University of TLEMCEN

Faculty of Technology

Mechanical Engineering Department

Email:amina.benomara@univ-tlemcen.dz

March 2024

Table des matières

┃ The tutorial serie 1

1. Ecercise 1

Water and other substances are divided into three different states: The solid state, the liquid state and the gaseous state.

1. What is the factor influencing the water's change of state?

2. One kilogram (1 kg) of pure water is frozen at 20°C.

a. What is the volume of water?

b. What happens to the water, and how does it change?

c. How does the volume of water change as a result of this transformation?

Data: ρ_{water}= 1g/mL;ρ_{ice}= 0.91 g/mL

2. Exercise 2

1. How many moles and atoms are there in: 6 g Fe, 6 g C, 6 g Ag

2. Calculate the mass in grams of : 1.52 mol Cu, 1.52 mol Na, 1.52 mol Au

3. How many moles and molecules of CuO, "Cu" atoms and "O" atoms are there in a   1.59 g sample of CuO copper oxide?

4. Which of the following samples contains the most iron atoms: 0.2 mol $Fe_2(SO_4)_3$; 20 g Fe; $2.5 \cdot 10^{23}$ Fe atom.

Data: Molar mass (g/mol): Fe = 56; C = 12; Ag = 108; Cu = 63.5; Na = 23; Au = 197; O = 16

3. Exercise 3

A- For each of the following statements, indicate whether it is a physical or chemical phenomenon (transformation) :

    1. The melting of ice.

    2. Dissolution of table salt in water.

    3. Toast a slice of bread.

    4. Cutting a sheet of cardboard.

    5. Melt chocolate.

    6. The bleaching of a pair of jeans by bleach.

    7. Sugar caramelization.

B- Concider the following table :

Matter	Melting Temperature (°C)	Boiling point (°C)
water : H_2O	0	100
Sodium chloride: $NaCl$	801	1465
Butane : C_4H_{10}	-138	-1

In what state is :

1. Water at (- 30°C) and at (+ 120°C)

2. Sodium chloride at (1600 °C) and at (25°C)

3. Butane at (-134°C)