

In the previous classes, all of you have learnt about matter, its states, properties etc. Now we can classify matter on the basis of some similarities and dissimilarities in their composition. So the substances may be pure or impure.

Pure substances are which contain particles of one kind. They are of two types: Elements and Compounds. Elements are made up of only one kind of atoms where as compounds are made up of two or more elements.

Elements: An element is a substance that can not be broken into simpler substances by any physical or chemical means. For example Gold, Silver, Oxygen, Helium etc.

Characteristics of an element:

- 1) An element can not be broken by any physical or chemical means.
- 2) It is a pure substance as it has atoms of only one kind.
- 3) It can exist independently.
- 4) It exists in all the three states of matter.

Elements can be classified into :

- i) Metals : Ex. Gold, Silver
- ii) Non metals: Ex. Oxygen, Sulphur
- iii) Metalloids : Ex. Boron, Silicon
- iv) Noble gases: Ex. Helium, Neon

Properties of metals:

- i) Metals are hard solid.
- ii) They are shiny.

iii) Metals are good conductor of heat and electricity.

iv) Metals have high melting point and boiling point.

v) Metals can be drawn into wires ie ductile.

vi) Metals can be beaten into sheets ie malleable.

vii) Metals produce a sound ie sonorous.

Properties of non metals:

i) Non metals are found in abundance which is either soft solids or gases.

ii) They are mostly brittle in nature.

iii) They do not possess shine.

iv) They are bad conductor of heat and electricity.

v) They are neither malleable nor ductile.

vi) Non metals have low melting point and boiling point.

vii) They are non sonorous.

Metalloids:

Elements that possess the properties of both metals and non metals are called metalloids.

They are solid, shiny or dull, ductile, malleable and conduct heat and electricity better than non metals but not as metals.

Noble gas:

There are some non metals that are present in gaseous state and do not react chemically with other elements such elements are called noble gases. These gases are present only in traces in air.

Symbols of elements:

A symbol of an element is one or two letter long and is chosen by the International Union of Pure and Applied Chemistry (IUPAC). A symbol represents one atom of an element.

How to write symbol of an element?

The rules according to which symbols of elements can be written are as follows:

- 1) Some elements are represented by the first letter of their names written in capital. For example N for nitrogen, O for oxygen etc.
- 2) The symbols of some elements are also derived from their Latin name. For example Latin name of copper is Cuprum and its symbol is Cu.
- 3) When there is more than one element having names beginning with the same letter then one of the elements is represented by the first letter and other by the first two letters.

For example Boron and Beryllium, Boron is represented by B and Beryllium is represented by Be.

Compounds: A compound is a pure substance formed by the chemical composition of two or more elements in definite proportion by mass. For example Carbon di oxide is CO_2 .

Differences between elements and compounds:

Element	Compound
An element is made up of only one kind of substance	A compound contains two or more elements combined in a fixed ratio.
An element can not be broken down into simpler substance by chemical method	A compound can be broken down into its constituent elements by chemical methods.
An element has its own set of properties	Compound differs in properties from its constituent elements
An element is represented by using a symbol	A compound is represented by using a formula

Home work

Learning of the symbols with name of first twenty elements:

Periodic Table of the Elements

1 1IA 1A																	18 VIII A 8A
1 H Hydrogen 1.008	2 IIA 2A											13 IIIA 3A	14 IVA 4A	15 VA 5A	16 VIA 6A	17 VIIA 7A	2 He Helium 4.003
3 Li Lithium 6.941	4 Be Beryllium 9.012											5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.180
11 Na Sodium 22.99	12 Mg Magnesium 24.305	3 IIIB 3B	4 IVB 4B	5 VB 5B	6 VIB 6B	7 VIIB 7B	8 VIII 8	9 VIII 8	10 VIII 8	11 IB 1B	12 IIB 2B	13 Al Aluminum 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulfur 32.065	17 Cl Chlorine 35.453	18 Ar Argon 39.948
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.887	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.631	33 As Arsenic 74.922	34 Se Selenium 78.971	35 Br Bromine 79.904	36 Kr Krypton 83.799
37 Rb Rubidium 85.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.95	43 Tc Technetium 98.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.906	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.414	49 In Indium 114.818	50 Sn Tin 118.711	51 Sb Antimony 121.760	52 Te Tellurium 127.6	53 I Iodine 126.904	54 Xe Xenon 131.294
55 Cs Cesium 132.905	56 Ba Barium 137.328	57-71 Lanthanide Series	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.217	78 Pt Platinum 195.085	79 Au Gold 196.967	80 Hg Mercury 200.592	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium [208.982]	85 At Astatine 209.987	86 Rn Radon 222.018
87 Fr Francium 223.020	88 Ra Radium 226.025	89-103 Actinide Series	104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [289]	109 Mt Meitnerium [278]	110 Ds Darmstadtium [281]	111 Rg Roentgenium [289]	112 Cn Copernicium [285]	113 Nh Nihonium [286]	114 Fl Flerovium [289]	115 Mc Moscovium [288]	116 Lv Livermorium [293]	117 Ts Tennessine [294]	118 Og Oganesson [294]
			57 La Lanthanum 138.905	58 Ce Cerium 140.116	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.243	61 Pm Promethium 144.913	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.500	67 Ho Holmium 164.930	68 Er Erbium 167.259	69 Tm Thulium 168.934	70 Yb Ytterbium 173.055	71 Lu Lutetium 174.967
			89 Ac Actinium 227.028	90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237.048	94 Pu Plutonium 244.064	95 Am Americium 243.061	96 Cm Curium 247.070	97 Bk Berkelium 247.070	98 Cf Californium 251.080	99 Es Einsteinium [254]	100 Fm Fermium 257.095	101 Md Mendelevium 258.1	102 No Nobelium 259.101	103 Lr Lawrencium [262]

Alkali Metal

Alkaline Earth

Transition Metal

Basic Metal

Semimetal

Nonmetal

Halogen

Noble Gas

Lanthanide

Actinide

Lipika Dutta