**2 practice. Metals and Non-metals**

The 105 elements, fortunately, exhibit 105 completely different sets of properties. When the major properties are considered it is found that the elements fall into one or two groups, the metals or the non-metals. The contrast between the properties of these two groups is given below. It is not to be expected that all elements in one class will agree in every detail; some differ in one or two properties from the others of their class; these exceptions are indicated in brackets.

***Metals Non-Metals***

# Physical properties

|  |  |
| --- | --- |
| Solid at room temperature (mercury is the only liquid metal) | Many are liquids and gases at room temperature |
| Have a high density (except potassium and sodium) | Density is usually low |
| Can be molded by pressure, i.e. they are malleable | Solid non-metals are brittle |
| Have high melting points and boiling points  | Have low melting points and boiling points |
| Are good conductors of heat and electricity  | Are poor conductors of heat and electricity (graphite is the only goodconductor of electricity among non metals) |
| Can be drawn into wire, i.e. they are ductile | Cannot be drawn into a wire |

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**Chemical properties**

* Have basic oxides  Have acidic oxides
* React with dilute acids forming salts  Salts of non-metals do not exist
* Form positive ions  Form negative ions
* Are liberated at the cathode during  Are liberated at the anode during electrolysis (hydrogen acts as a metal) electrolysis

The chemical properties are much more conclusive than the physical properties for deciding whether a particular element is to be regarded as a metal or a non-metal, e.g. if an element forms a basic oxide it must be classified as a metal. A basic oxide is never formed by a non-metal.

**Question 1**Exercise

**2) Distinguish between the physical properties of metals and non-metals with reference to -**

**(a) lustre (b) malleability (c) ductility (d) tensile strength (e) sonority (f) conduction of heat and electricity (g) melting and boiling point (h) density**

**Answer:**

Solution :

| **Property** | **Metals** | **Non- Metals** |
| --- | --- | --- |
| (a) Lustre |  |  |
| (b) Malleability |  |  |
| (c) ductility |  |  |
| (d) tensile strength |  |  |
| (e) Sonority |  |  |
| (f) Conduction of heat and electricity |  |  |
| (g) Melting and boiling point |  |  |
| (h) Density |  |  |

**3) With reference to the physical properties of metals and non-metals, state the following exceptions.**

**(a) A metals which is liquid at room temperature**

**(b) A non-metal which sublimes and is non-lustrous.**

**(c) A non-metal which has low tensile strength**

**(d) A non-metal which conducts electricity**

**(e) A metal which floats on water**

**Choose the answer:**

Mercury; Iodine; Phosphorus; Graphite; Lithium, Sodium , Potassium

**Question 2) With reference to the following metals state their - use in daily life. Metals:**

**Copper; iron; aluminium; magnesium; zinc; lead; silver**

**Answer:**

(1) Metal ?:

1. Making thin wires for electric purpose, because it is a good conductor of electricity.
2. Making calori meters as it is a good conductor of heat.

(2) Metal ?:

1. Steel is used in automobiles.
2. Pig iron is used in drain pipes as it can be easily moulded.

(3) Metal ?:

1. Making utensils
2. Me powder is mixed with linseed oil in paints because it is anti-corrosive in nature.

(4) Metal ?:

1. It is used in fireworks
2. It produces a bright flash and hence it is used in strip form in photography.

(5) Metal ?:

1. For galvanising iron sheets, because it does not rust.
2. It acts as a cathode in dry cells.

(6) Metal ?:

1. In making pipes because it is malleable and reactant to corrosion.
2. It is used in bullets because it has **high specific gravity**.

(7) Metal ?:

1. For making jewellery
2. It is used for electric purposes.

**Vocabulary**

basic oxide – щелочные оксиды

considered – рассматривать, считать

act - действовать, вести себя

dilute acid - разбавленная кислота

acidic oxide – кислый оксид;

exhibit –показывать;

salt – соль;

expect – ожидать;

positive ion – положительный ион;

density – плотность;

negative ion – отрицательный ион;

Solid – твердый;

electrolys – электролиз;

melting point - температура плавления;

anode, cathod – анод, катод

boiling point – температура кипения;

exist – существовать

malleable – ковкий

electrolysis – электролиз

ductile - пластичный

wire – провод

conductor – проводник

exhibit – проявлять

liberate – освобождать, выделять

conclusive – убедительный, решающий

brittle – хрупкий

draw – превращаться

drawn into wire – превращается в проволоку

1. What are the main chemical properties of metals?
2. What are the main chemical properties of non-metals?
3. What are the main physical properties of metals?
4. What are the main physical properties of non-metals?