Experiment: Elements, compounds and mixtures

AIM: To prepare (a) a mixture and (b) a compound rising iron filings and sulphur powder and distinguish between these on the basis of

(i) Appearance, i.e., homogeneity and heterogeneity
(ii) Behaviour towards a magnet
(iv) Effect of heat

MATERIALS REQUIRED
Two test tubes, a test tube holder, a china dish, two watch-glasses, a glass rod, a wire gauze, a tripod stand, a Bunsen burner, a magnet, a magnifying glass, iron filings (7g), sulphur powder (4g) and carbon disulphide.

THEORY
A mixture is formed by simple mixing of two or more pure substances in any proportion by mass. A mixture is formed as a result of physical change. A mixture may be homogeneous or heterogeneous. The components of a mixture retain their individual properties even in the mixture. The components of a mixture can be separated by simple physical techniques such as evaporation, filtration, crystallization, magnetic separation, etc.

A compound is formed by chemical combination of two or more elements in definite proportion by mass. A compound is formed as a result of chemical change. A compound is a pure substance and is always homogeneous. The constituents of compound do not retain their properties in the compound. The constituents of a compound cannot be separated by simple physical techniques but can be separated only by some chemical means.

PROCEDURE
Preparation of a Mixture of Iron Filings and Sulphur
1. Take 7g of iron filings and 4g of sulphur. Mix them and grind them in a pestle and mortar thoroughly but gently.
2. Transfer the mixture to a watch glass and label it 'A'.

Preparation of a Compound of Iron and Sulphur
1. Transfer half the mixture 'A' in a china dish. Place the china dish on a tripod
stand and heat the mixture strongly With the help of a Bunsen burner. Stir the constituents continuously with a glass rod, till a black mass is obtained. Stop heating and let the black mass cool.

2. Grind the black mass formed into powder with the help of a pestle and mortar. Transfer the black powder into a watch glass and label it 'B'. The black mass thus formed is iron sulphide.

**To Distinguish between a Mixture and a Compound**

Observe the following properties

<table>
<thead>
<tr>
<th>S. No</th>
<th>Experiment</th>
<th>Observation, Substances</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Substance A</td>
<td>Substance B</td>
</tr>
<tr>
<td>1</td>
<td>Appearance</td>
<td>Iron and sulphur particles can be seen separately.</td>
<td>Particles are not seen separately</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>‘A’ is heterogeneous ‘B’ is heterogeneous</td>
</tr>
<tr>
<td>2</td>
<td>Behaviour towards magnet</td>
<td>Iron fillings are attracted by magnet</td>
<td>It is not attracted by magnet</td>
</tr>
<tr>
<td>3</td>
<td>Behaviour towards carbon disulphide</td>
<td>Sulphur part dissolves and iron settles down at the bottom.</td>
<td>It does not dissolve</td>
</tr>
</tbody>
</table>

**RESULT**

1. The mass A, formed by simple mixing of iron filings and sulphur, is a mixture of iron and sulphur. It is heterogeneous. In mixture, iron and sulphur retain their properties.
2. The black mass B obtained by heating iron filings and sulphur is a compound of iron and sulphur.

\[
\text{Fe} + \text{S} \rightarrow \text{FeS}
\]
It is homogeneous. In the compound B, both iron and sulphur loose their individual properties.

**PRECAUTIONS**

1. Do not heat the mixture of iron and sulphur in an ordinary glass tube as the test tube may crack due to strong heating. Use a china dish to heat the mixture.
2. Carbon disulphide is highly inflammable. Keep it away from the flame.
3. Minimum amounts of mixture and compound should be used for carrying out various tests.
4. Do not touch any chemical with bare hands.
5. Wash your hands properly with soap after the experiment.

*(Draw the following diagrams on the left hand side of your journal)*