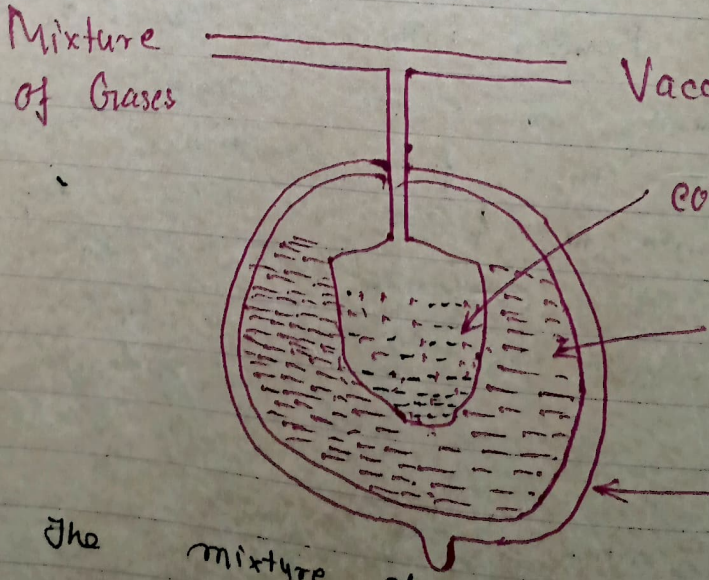
By the above process noble gases accum
in flask some oxygen also remains
in the flask. O2 gas is absorbed by
alkaline Pyrogallol solution. Thus we
get a mixture of Noble gases.
Noble gases are separated from
other by the method of- differential
absorption through coconut charcoa

Step (2) Separation of Gases from o
other by Dewar's Flask →

This method is based
differential absorption of these gases by
charcoal. In this method the mixture
introduced into a bulb filled with
Charcoal and Placed in a Cold bath (-1
in a Dewar Flask as shown in the



The mixture of gas is allowed to
remain here about for one hour. A
Krypton and Xenon are absorbed Her
The unabsorbed gases (Helium and Neo
are pumped out of the
brought-

at -180°C. Here Neon is absorbed and helium is obtained in free condition. Neon is recovered from this charcoal by heating. The first charcoal containing Argon, Krypton, and Xenon is brought in to a contact with a 3rd charcoal maintained at liquid air temperature. Argon diffuses into this charcoal and can be recovered by heating his charcoal. The first charcoal Now contains Kr and Xe.

Now, the temperature of this charcoal is raised up to -90°C. Here Kr. Separates out - Xenon remains in the charcoal.

It can be recovered by warming the charcoal.

Extraction of Noble gases from liquid air →

This method is based upon fractionation of liquid air this method is used to obtain noble gases at large scale. This method Has developed by Rayleigh and Ramsay.

The B.P. of various constituents of air at 760 mm. are given below.

Elements.	°K
He	4.13
Ne	27.18
N_2	77.20
Ar	87.15
Kr	120.11
O	90.02
Rn	165.23

Cold air compressed at 10 - 35 atmosphere and it is passed through a fractionating Column. On doing so we get two main fractions.

(1) The fraction one contains mainly N_2, and Ne. An small amount of oxygen may be present

(2) The 2nd fraction consists of Oxygen mixed with Ar, Kr and Xe.

Separation of He and Ne →

The fraction (1) is passed through a spiral column lying in a liquid nitrogen. Here most of the oxygen gas gets liquified while the most Volatile He and Ne escape. Any residual nitrogen passed with He and Ne can be removed by passing the gaseous mixture over CaC_2.

$$CaC_2 + N_2 \rightarrow CaNCN \rightarrow Ca(NH_2)_2$$

Now the gaseous mixture contains He and Ne. The separation of He and Ne can be affected by cooling the mixture in liquid hydrogen where Neon gets solidified, while helium passed out still as a gas.

Separation of Argon → In order to separate

Argon fraction (2) is fractionated by passing it around coils containing liquid nitrogen. Here oxygen with Kr and Xe condensed and Argon is passed as a gas.

Separation of Kr & Xe → Now the liquid

oxygen contains Kr and Xe. The liquid is fractionated by cold air. Easy separation is possible because of the wide difference in boiling points.

Periodic discussion of He, Ne, Ar, Kr, Xe and Rn

Similarities :—→

(1) All the elements are gaseous in nature at ordinary temperatures.

(2) The outer shell configuration of all these elements are s^2p^6 except Helium.

(3) All these gases are odourless, colourless and tasteless.

(4) All thes gases are monoatomic. It is also supported by the value of C_p/C_v ratio.

(5) All these gases are sparingly soluble in water.

(6) The ionisation energy of these gases are very high.

(7) The electro negativity and electron affinity of these gases are taken to be zero

(8) All these gases generally do not undergo for a chemical combination. However Fluorides of Xenon are Known.

(9) M.P. and B.P → M.P. and B.P. of gases are however very low.

(10) All these gases are very rare.

Periodic Trends in gases :-

(i) Density, M.P. ionisation energy. Heat of vaporisation, Atomic radious. Increases on moving from top to bottom.

(ii) All these gases are sparingly soluble in water.

(iii) Electronegativities of noble gases are taken to be Zero

(iv) Electron affinity of these gases are very small/ nearly to zero. (v) They are mono atomic

All these gases give characteristic Spectra.

Uses of Noble gases → There are several applications of Noble gases.

Application of Helium →

(i) Helium is used in filling air ships, weather balloons. Although it is twice heavy as hydrogen

(ii) Helium-oxygen mixtures are used for respiration in deep sea divings instead of air because Helium is much less soluble in blood than nitrogen under high pressure.

(iii) Helium has a number of Scientific uses. It is used in producing very low temperatures.

(iv) Helium is used to provide an inert atmosphere in several metallurgical processes i.e. in the preparation of reactive metal titanium. & the preparation of Mg.

Application of Neon →

(i) It produces a beautiful orange red glow when an electric current is passed through it. under a low pressure 2 cm. This glow is visible even in moist air for this reason, Neon lights are used as beacon lights for air pilots. Neon is now extensively used in sign advertising by coloured lights. and in fluorescent tubes.

(2) It has a remarkable property of conducting exceedingly high currents when a voltage of the order of 200 volts is applied. It is therefore used in safety devices for protecting electrical instruments such as voltmeters, relays, rectifiers.