

Chromatography

Is a technique used to separate and identify the components of a mixture.

Works by allowing the molecules present in the mixture to distribute themselves between a stationary and a mobile medium.

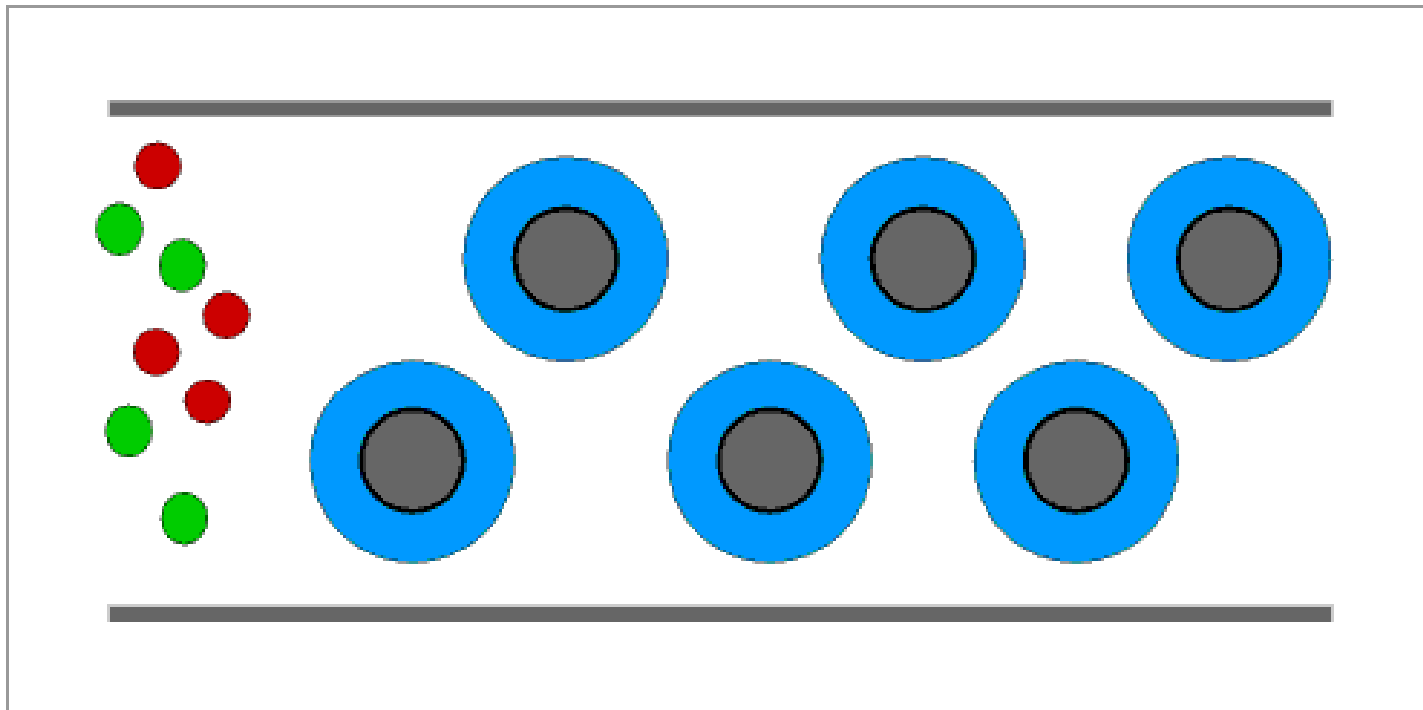
Molecules that spend most of their time in the mobile phase are carried along faster.

Gas Liquid Chromatography

Here the mobile phase is an unreactive **gas** (eg Nitrogen) flowing through a tube.

And the stationary phase is an involatile **liquid** held on particles of a solid support.

In the animation below the **red** molecules are more soluble in the **liquid** (or less volatile) than are the **green** molecules.



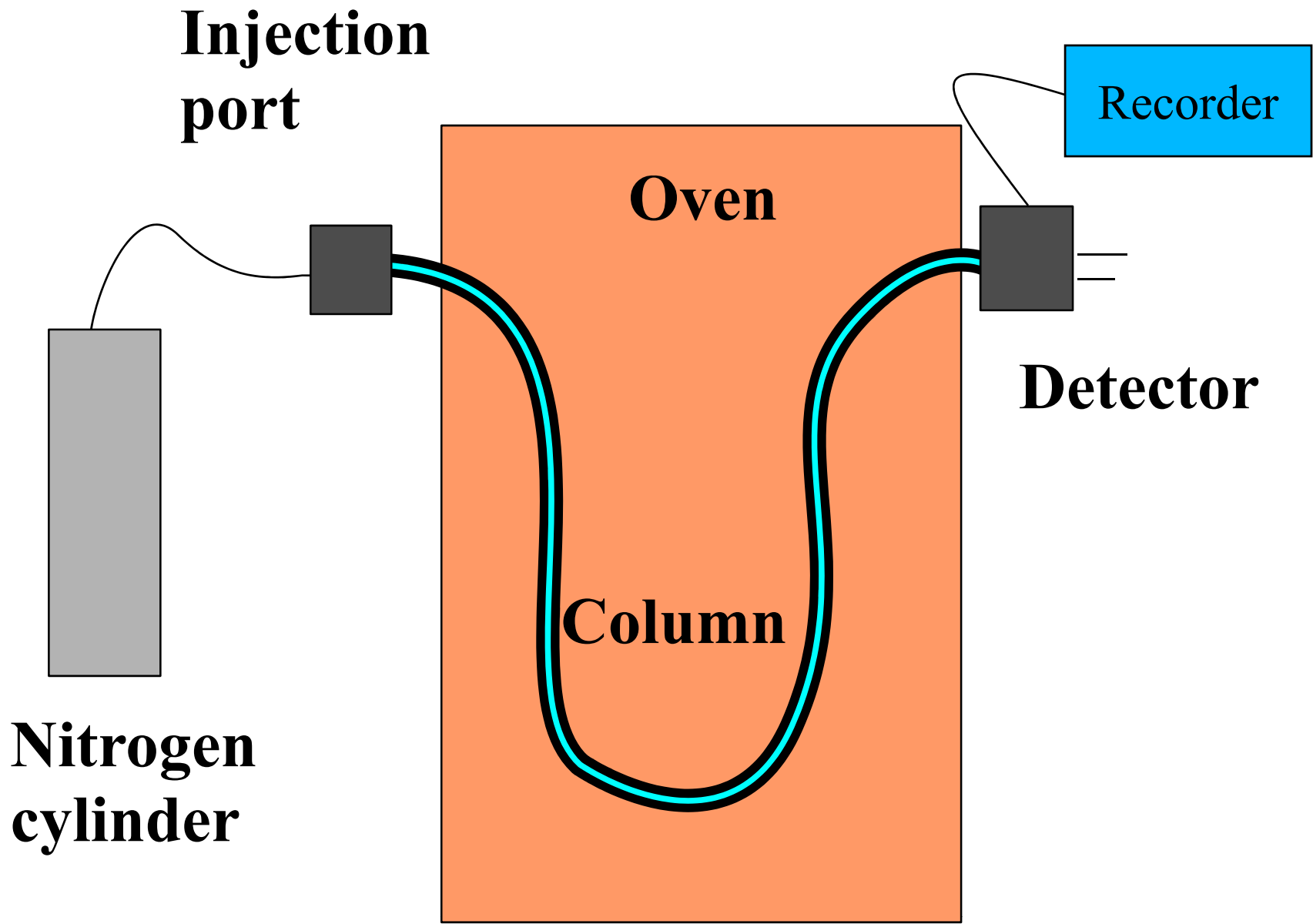
In practice the **Column** is contained in a thermostatic oven.
(Why ?)

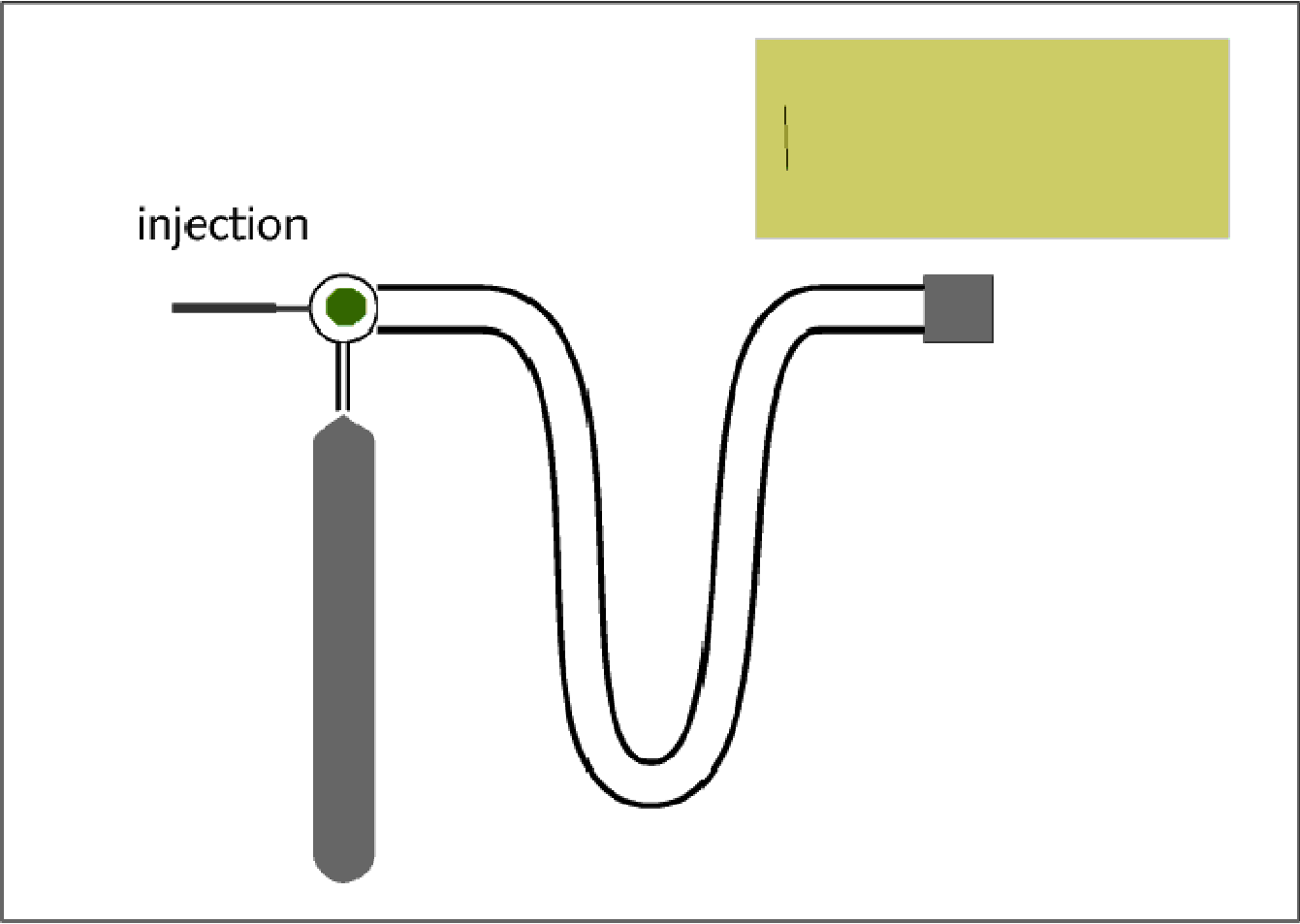
About 1 μ L of liquid is injected into one end of the column.

As each component reaches the other end it is detected and registered on a chart recorder.

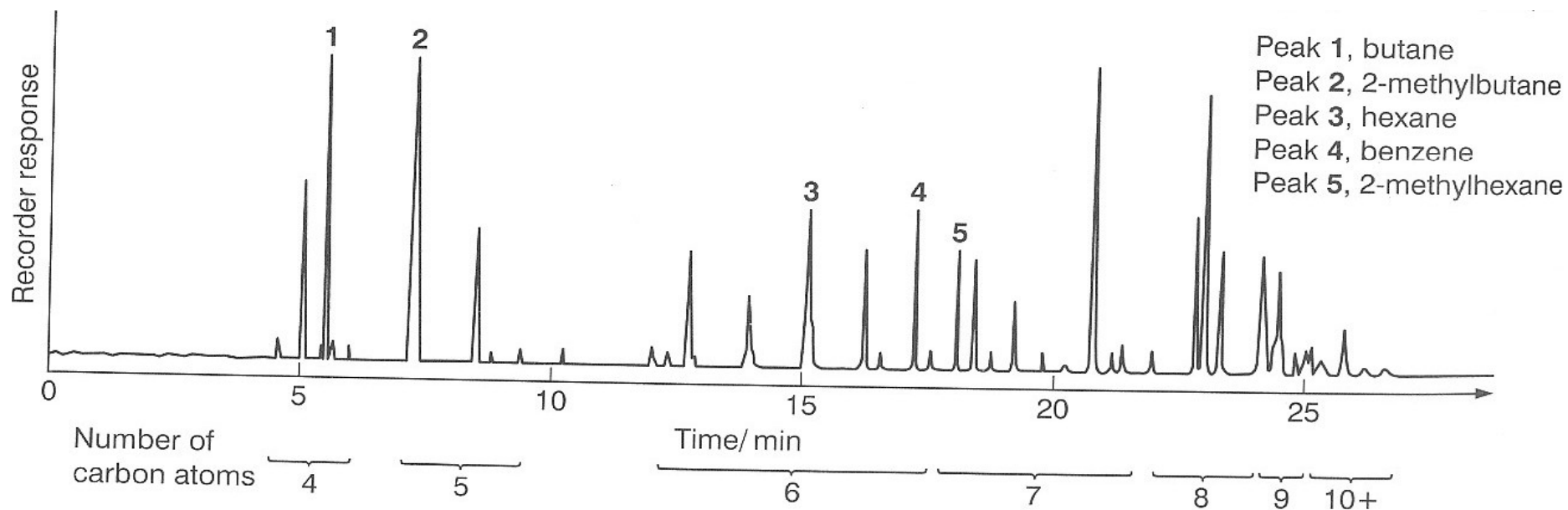
The **Retention Time** is characteristic of a particular substance. (for the same column, temperature, gas flow etc.)

The area under each peak indicates the relative quantities.





Chromatogram of petrol



Suggest identities of some of the unlabelled peaks.

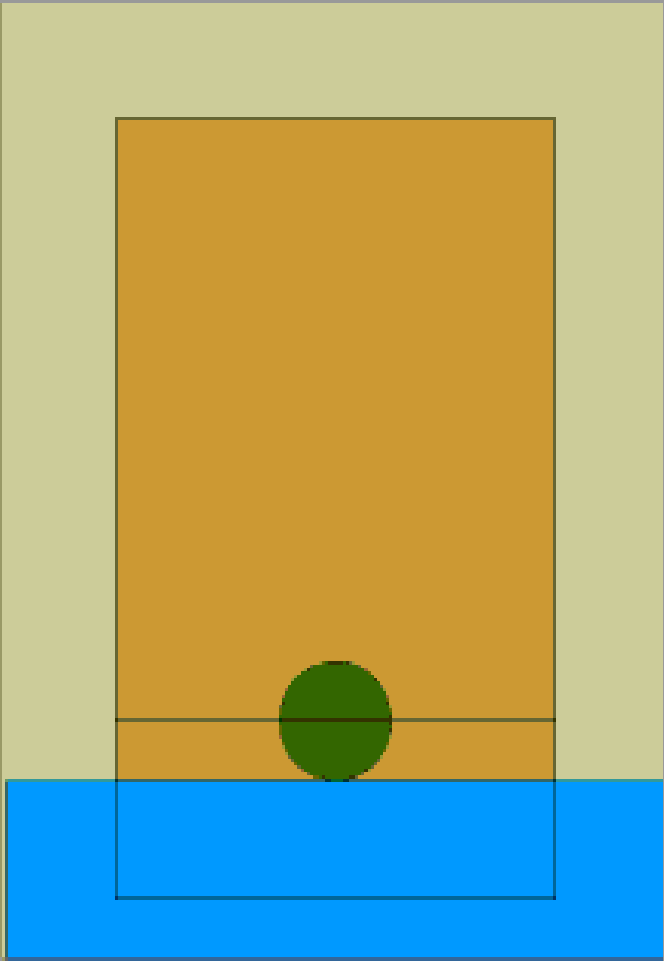
Thin Layer Chromatography

Here the mobile phase is a liquid

Flowing past a **thin layer** of powder on a solid support.

Substances that are less attracted to the solid or are more soluble in the liquid move faster.

And so move further up the plate by the time that the process has been stopped by taking the plate out of the liquid. - larger **R_f**



$$R_f = \frac{\text{distance moved by substance}}{\text{distance moved by solvent front}}$$

For substances that are very soluble in the liquid
 R_f will be close to

1

For substances that are rather insoluble in the liquid
 R_f will be close to

0