Mass Spectroscopy
Essays
Physics class section 11

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October 25, 2015

1 Introduction

1.1 Definitions

Due to my research on the categories of Mass Spectroscopy, it is an analytical chemistry technique that benefit people to identify different characteristics and amount of different molecules. It is measuring the mass-to-charge ratio and abundance of gas-phase ions.

1.2 Outline of what happened in the mass spectroscopy

There are four section in the Mass spectroscopy can be seperated to explain, which is: Ionisation, Accelerations, Deflection, Detection. These four parts had to work together in order for the mass spectroscopy to function and collect datas.

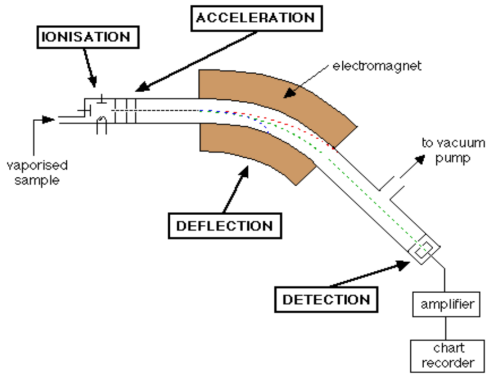

Figure 1: label image

2 Breakdown of the four sections

2.1 Ionisation

Ionisation is where atoms or molecules are ionised by knocking one or more electrons away to give positive ion.

2.2 Accelerations

All those ionised molecules have been accelerated, so that they can all have the same velocity and kinetic energy.

2.3 Deflection

The ions are then deflected by a magnetic field according to their masses. The lighter they are, the more they are deflected.

2.4 Detection

The beam of ions passing through the machine is detected electrically and recorded immediately on the computer.

3 calculations

3.1 formulae in accelerator

$$r = \frac{mv^2}{qvb} = \frac{mv}{qb}$$

If the velocity v is produced by an accelerating voltage V:

$$k(gain) = U(loss)$$

$$\frac{1}{2}mv^2 = qv$$

$$v = \sqrt{\frac{2qv}{m}}$$

After substitutions:

$$r = \frac{1}{B}\sqrt{\frac{2mv}{q}}$$

3.2 Velocity selector with B,E

$$F(B) = F(E)$$

$$qvb \times sin(90) = qE$$

$$vb \times 1 = E$$

$$V = \frac{E}{B}$$

3.3 Radius of path produce by magnetic field

$$F(net) = ma$$

$$qvb \times sin(90) = m \times \frac{v^2}{r}$$

$$qB = m \times \frac{v}{r}$$

$$\frac{q}{m} = \frac{v}{rB}$$

4 Stick diagram

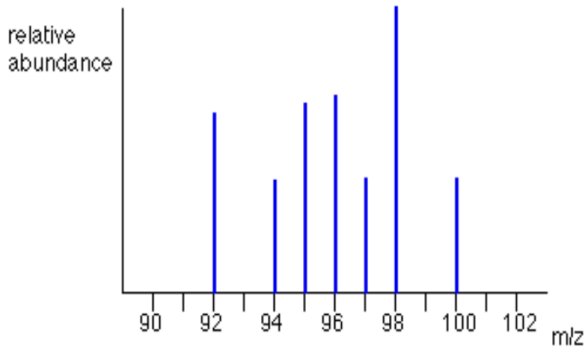

Figure 2: label image

The image above is a diagram of the mass spectroscopy result, the chart recorder mark down all the data. The data is often managed and organized as a stick diagram. This shows the relative current produced by ions of varying mass/charge ratio.

5 Citations

1. "The Mass Spectrometer - How It Works." The Mass Spectrometer - How It Works. Chemguide.co.uk, n.d. Web. 26 Oct. 2015.

2. "Mass Spectrometer." Mass Spectrometer. Hyperphysics.phy-astr.gus.edu, n.d. Web.

3. "Simple Explanation of the Mass Spectrometer." YouTube. YouTube, n.d. Web. 26 Oct. 2015.