



# T.O.F. Mass Spectrometer

## ① Ionisation

A)

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B)

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## ② Acceleration

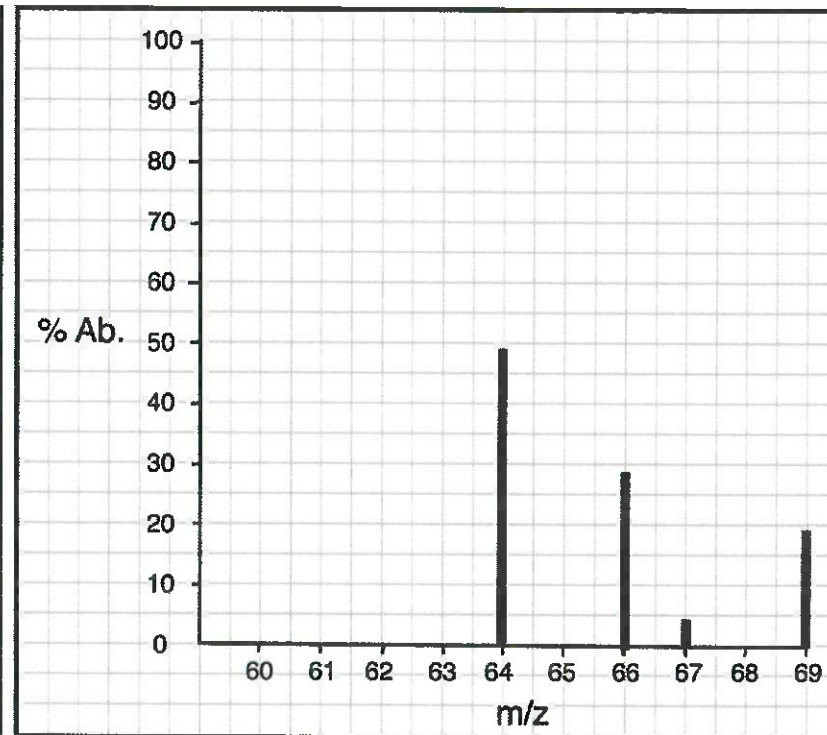
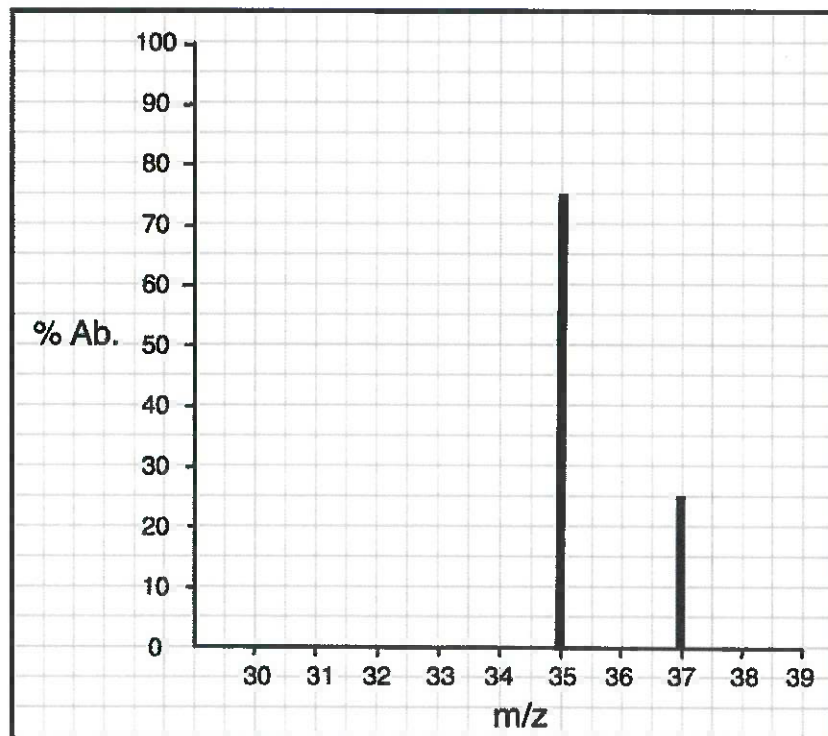
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## ③ Detection



# Mass Spectra



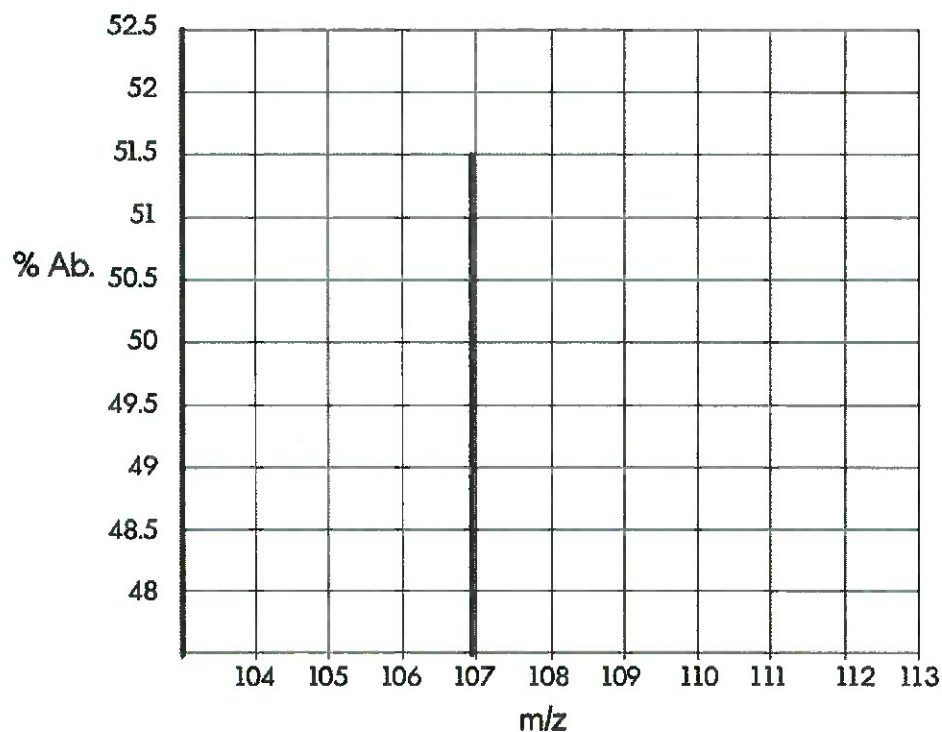


## Calculating an Unknown Isotopic Mass

1 2 3 4 5

Isotope	% Abundance
$^{86}\text{Sr}$	9.9
$^{87}\text{Sr}$	70
$^{88}\text{Sr}$	82.6

Complete the table by deducing the missing % Abundance and hence the identity of the missing isotope. ( $A_r \text{ Sr} = 87.71 \text{ g.mol}^{-1}$ )

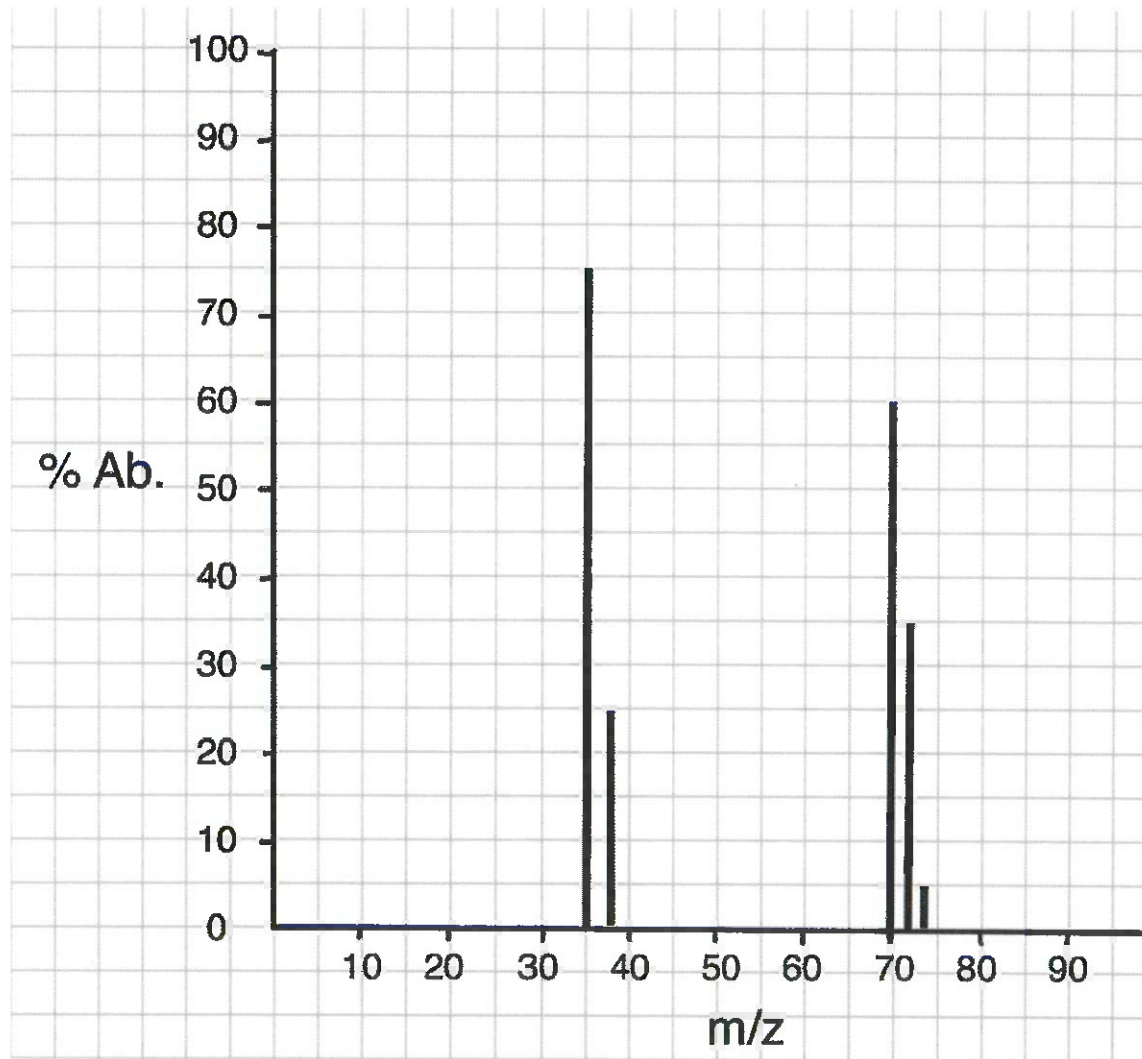


Silver has two stable isotopes. One of which is shown in the graph. Deduce the identity and abundance of the second isotope and complete the mass spectrum. ( $A_r \text{ Ag} = 107.97 \text{ g.mol}^{-1}$ )



# Mass Spectra : Diatomic Elements

e.g.



Ratios



# T.O.F. Mass Spec - Velocity Calcs

1 2 3 4 5

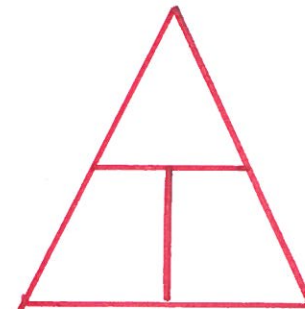
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Finding Velocity:

$$= \sqrt{\frac{\quad}{\quad}}$$

Example Calc e.g.

If K.E. = \_\_\_\_\_ J, calculate the velocity of the  $^{63}\text{Cu}^+$  ion.





# Electron Orbitals

1 2 3 4 5

## Types of Orbital

ENERGY LEVELS	ORBITALS	$e^-$ s	NOTATION



# Writing Electronic Configurations

1 2 3 4 5



•  
e.g. • • •  
• • •

## Exceptions!

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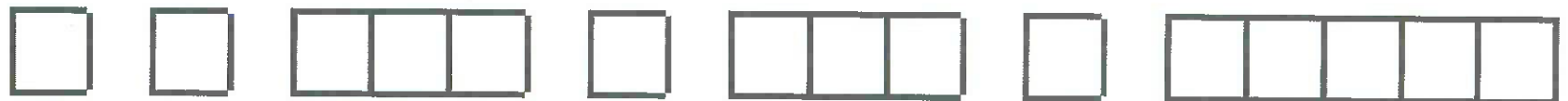


# Electrons in Boxes

1 2 3 4 5



e.g.







# Electronic Configuration of Ions

1 2 3 4 5



Exception! Transition Metals

RULE:

e.g.



# 1<sup>st</sup> Molar Ionisation Energy

The Equation

e.g.

Need to know

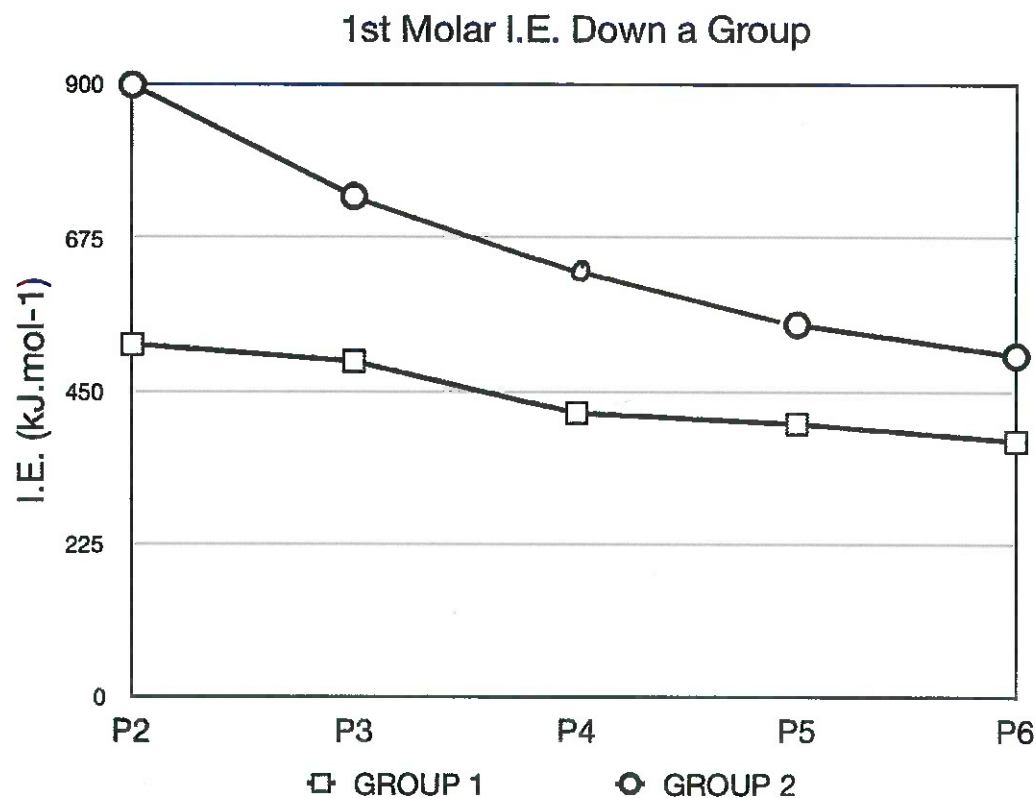
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# 1<sup>st</sup> Molar I.E.'s - Down a Group

## The Explanation



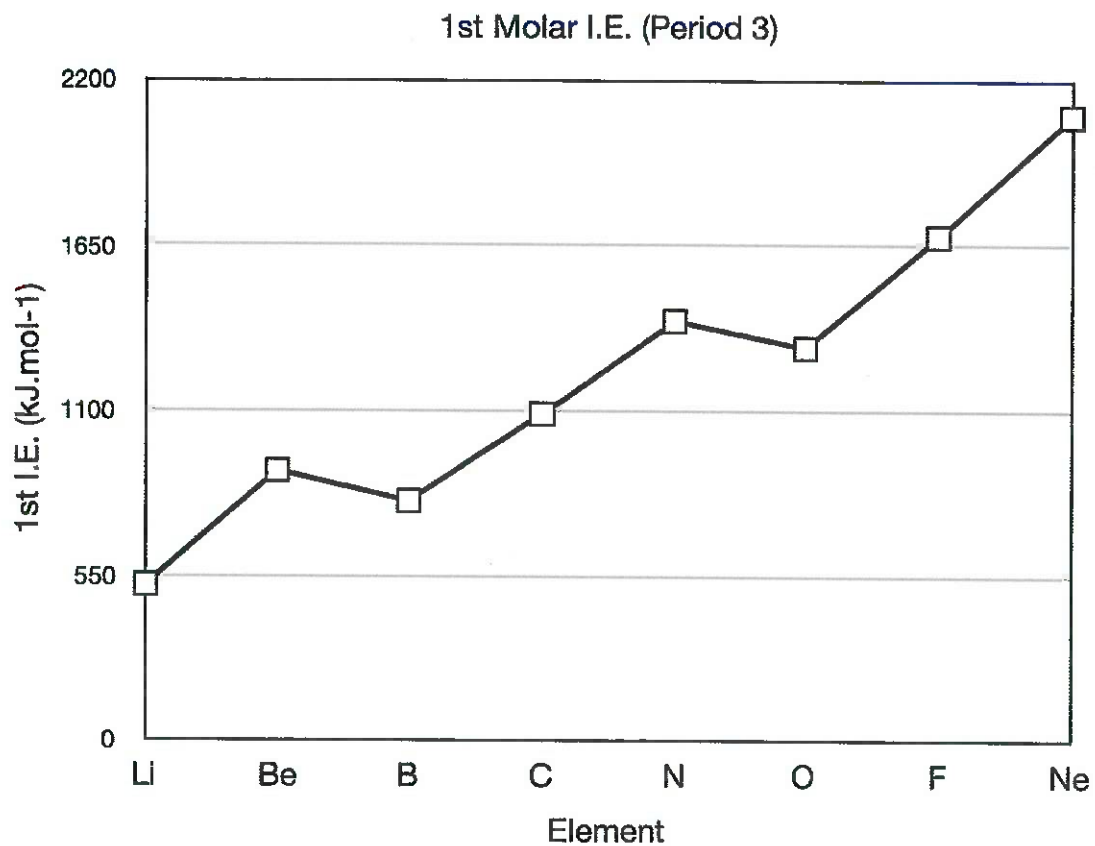
## Common Questions



# 1<sup>st</sup> Molar I.E. - Across a Period

1 2 3 4 5

## The Explanation



## The Exceptions

i.e.

i.e.



# 1<sup>st</sup> Molar I.E. - Across a Period : Exceptions

1 2 3 4 5

Group 2 → Group 3

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∴

Group 5 → Group 6

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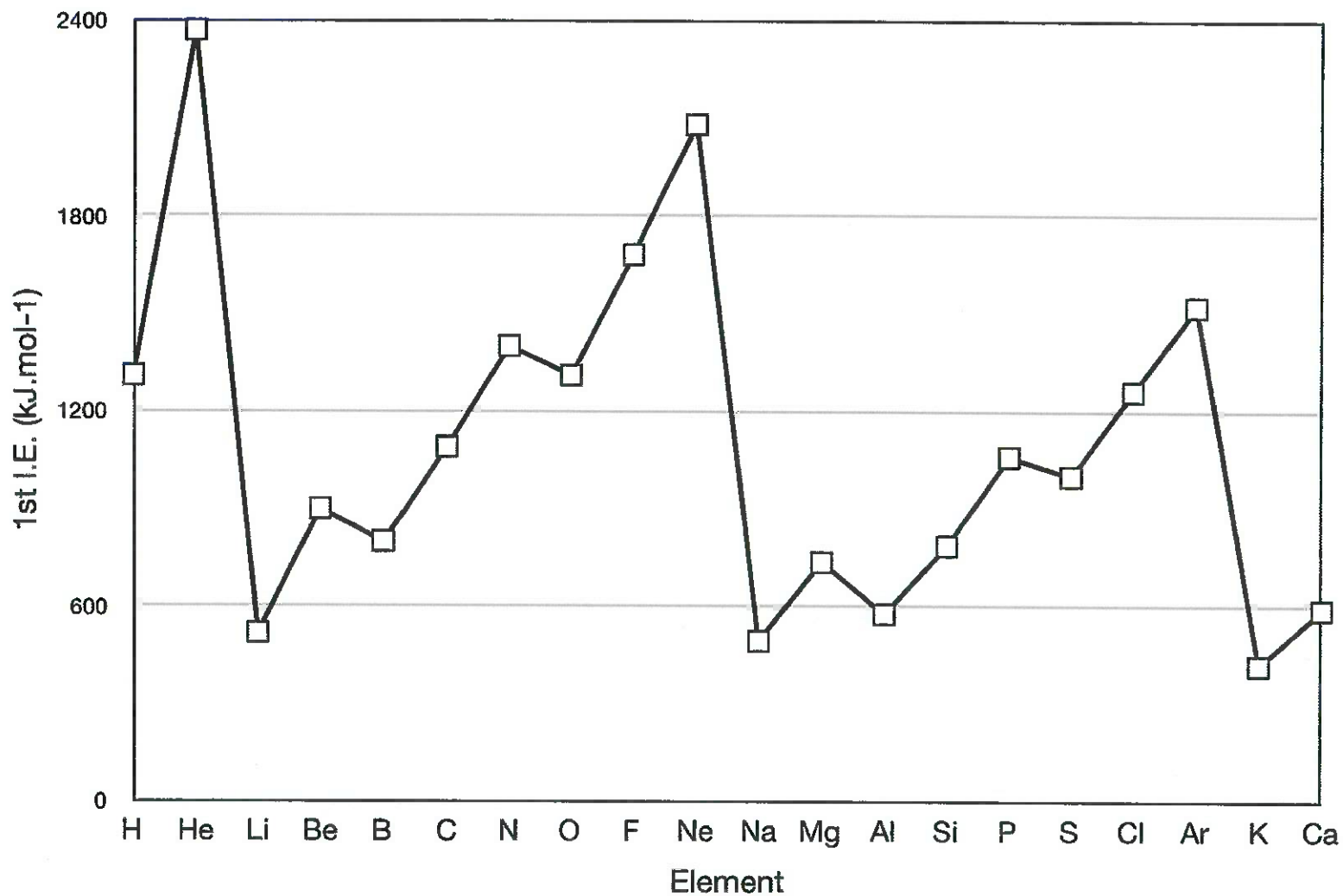
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# The Graph!

### 1st Molar Ionisation Energies



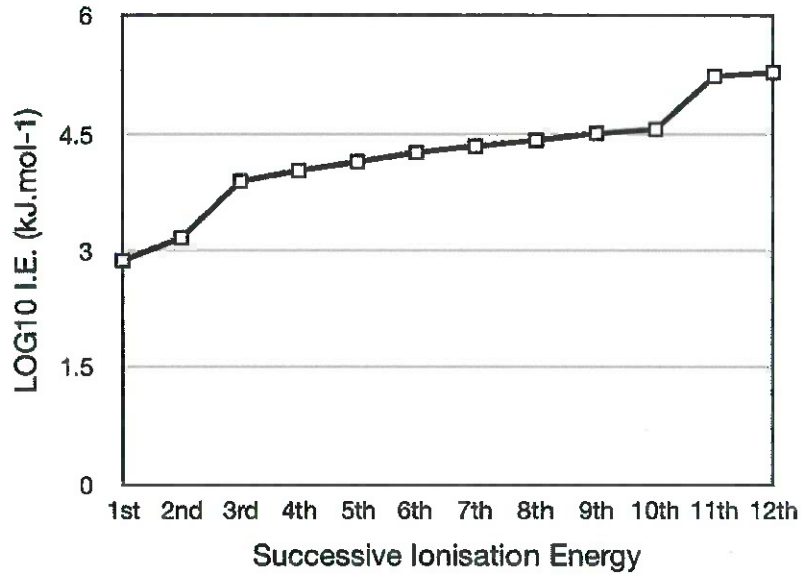


# Successive Ionisation Energies

Successive  
Ionisation  
Energies

e.g.

Successive Ionisation Energies (Magnesium)



Successive Ionisation Energies (Fluorine)

