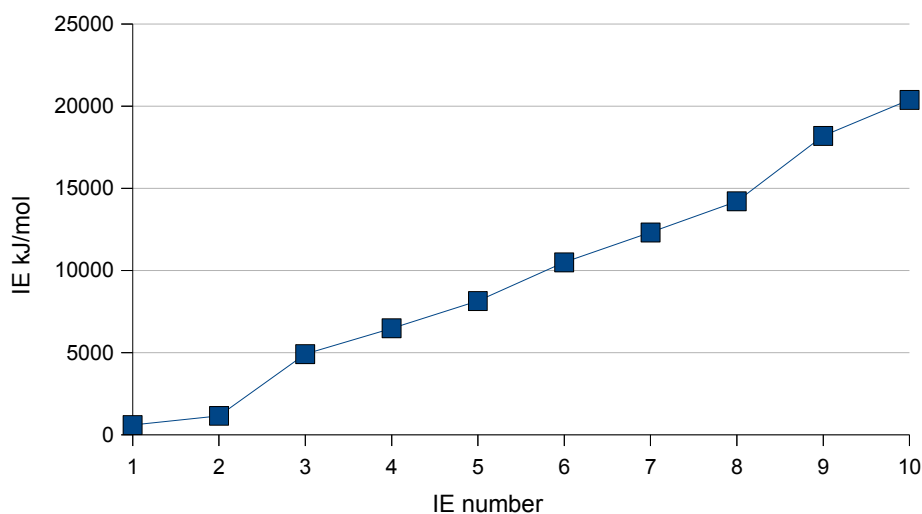


Chemguide – questions

SUCCESSIVE IONISATION ENERGIES

You may need a copy of the Periodic Table for some of these questions.

1. The second ionisation energy of sodium is 4560 kJ mol^{-1} . Write the equation which represents the reaction occurring during the second ionisation energy of sodium.
2. The four successive ionisation energies of beryllium are: 900 1760 14800 21000. Why is there a very big increase in size between the second and third ionisation energies?
3. The following are all lists of successive ionisation energies for different elements. In each case, decide which group of the Periodic Table the element is to be found in. None of these elements comes from the d-block.
 - a) 799 2420 3660 25000 32800
 - b) 736 1450 7740 10500 13600 18000 21700 25600
 - c) 1000 2260 3390 4540 6990 8490 27100 31700
4. The graph shows the first ten ionisation energies for calcium.



- a) Say which electron is being removed at each of these ionisations.
- b) Point out and explain all the changes of slope in the graph.
- c) The eleventh ionisation energy of calcium is $57050 \text{ kJ mol}^{-1}$. Explain why it is so much higher than the other values on the graph.

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5. These questions are to help you answer possibly confusing questions that some examiners ask to really test your understanding of ionisation energies.
- Which has the greater value, the first ionisation energy of magnesium or the second ionisation energy of aluminium?
 - Which has the greater value, the third ionisation energy of magnesium or the third ionisation energy of aluminium?
 - Which has the highest second ionisation energy, potassium, calcium or scandium?
 - Which has the highest third ionisation energy, potassium, calcium or scandium?