Describing & explaining trends in ionisation energy (Level 3) exam tips

• First ionization energy is the energy required to remove one mole of the most loosely held/outermost electrons from one mole of an atom in the gaseous state.

The 1st ionisation energy of sodium Na(g) 🡪 Na+(g) + e-

• A graph showing the trend in ionisation energy across a period and down a group



When discussing trends in first ionisation energy refer to

1. number of protons

2. attractive force of the nucleus/nuclear charge

3. relationship between the electrons and the energy levels

4. attraction for the valence electrons

You must refer to and link any similarity (or difference) to the elements asked about in the question.

• **The first ionisation energy increases across the (second) period.**

There is an increase in the number of protons therefore the nuclear charge/attractive force of the nucleus increases. As the electrons are added to the same energy level across the second period, the electrostatic attraction for the valence electrons increases. This means more energy is required to remove an electron from the valence shell.

• **The first ionisation energy decreases going down a group.**

There is an increase in the number of protons therefore the nuclear charge/attractive force of the nucleus increases. However, the atomic radius increases down a group as electrons are added to additional energy levels, so there is an increase in the distance of the outer electrons from the nucleus.

The full inner energy levels shield the outer electrons from the protons in the nucleus, so the electrostatic attraction is reduced. Additional energy levels result in greater shielding/repulsion between energy levels. The further the outer electron is from the nucleus, the less energy needed to remove it.

Also…”don’t be daft”

You must include (g) for GASEOUS in the chemical equation representing ionisation energy

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