Checking Two Ionization Steps in a Model Detector

Scoring guide · one credit per question · review written work against each rubric

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Question 1

Choice (2)

Both first energies are below 1,500 kJ/mol. Only Mg’s second energy is below the per-step limit.

Question 2

The second sodium value is 4,560 kJ/mol. The difference is 4,560 − 1,500 = 3,060 kJ/mol.

Question 3

The first electron comes from sodium’s third shell. Once it is gone, the next electron comes from the second shell, closer to the nucleus and more strongly attracted.

Question 4

Both 496 and 4,560 kJ/mol are below 4,600, so the model allows the first two removals. The third removal energy is not listed, so the table cannot establish whether the third step fits.

Question 5

Removing a negatively charged electron makes the ion more positive. It does not change the number of protons, so the atom’s element remains magnesium.