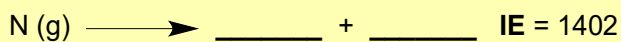


CONCEPT: PERIODIC TREND: IONIZATION ENERGY

- **Ionization Energy (IE):** Energy *absorbed* to remove an electron from a gaseous atom or ion based on position in ____.



- **Endothermic Reaction:** Reaction *absorbs* energy in order to break a bond.
- Ionization energy = _____ energy of a given electron.
- **Periodic Trend:** Ionization Energy _____ moving from left to right across a period and going up a group.

[illegible]

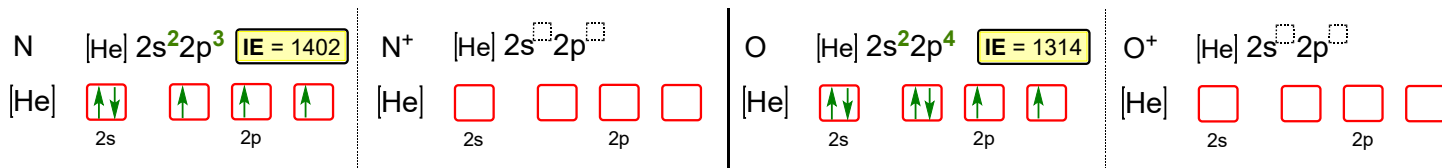
EXAMPLE: Which of the following atoms has the smallest ionization energy?

- a) P b) F c) K d) Cr e) Br

Exceptions to Ionization Energy

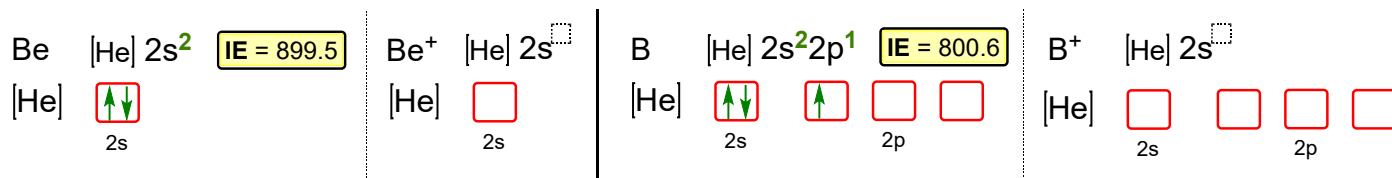
- When in the same period, Group _____ elements have a lower ionization energy than Group _____ elements.

- **Explanation:** p subshell orbitals are most stable when half-filled or totally-filled with electrons.



- When in the same period, Group _____ elements have a lower ionization energy than Group _____ elements.

- **Explanation:** s subshell orbitals are most stable when totally-filled.



CONCEPT: PERIODIC TREND: IONIZATION ENERGY

PRACTICE: Rank the following elements in order of increasing ionization energy: Br, F, Ga, K and Se.

PRACTICE: Which of the following has the highest ionization energy?

a) Ar

b) Na⁺

c) Na

d) Mg

e) Kr

PRACTICE: The energy of an electron in a one-electron atom or ion equals $(-2.18 \times 10^{-18} \text{ J}) (Z^2/n^2)$. Estimate the ionization energy for the valence electron of the Li atom and compare it to its theoretical value of 520 kJ/mol.