

- Larger nuclear charge (Z) = larger effective nuclear charge (Z_e) \rightarrow that means higher ionization energy
 - More loops = larger $n \rightarrow$ so ionization energy decreases
 - This would shield the electron. Shielding causes the electron wave to increase in energy, and so the ionization energy decreases
 - Electron-electron repulsion tends to decrease the ionization energy.

2. Ionization energy: $I = \Delta E = E_f - E_i = E_\infty - E_n = 0 + \frac{(2.18 \text{ aJ})Z_e^2}{n^2} = \frac{(2.18 \text{ aJ})Z_e^2}{n^2}$

Atom	Z	Electron configuration	Trend in ionization energy compared to previous atom, and explanation
H	1	$1s^1$	-
He	2	$1s^2$	IE of He is higher than H, because He has a larger nuclear charge, but the electron being ionized is still $n = 1$ (increased effective nuclear charge)
Li	3	$1s^2 2s^1$	IE of Li is lower than He, because the electron ionized from He is $1s$ and the electron ionized from Li is $2s$ (new shell)
Be	4	$1s^2 2s^2$	IE of Be $>$ IE of Li, because of the increased effective nuclear charge.
B	5	$1s^2 2s^2 2p_x^1$	IE of B $<$ IE of Be, because $2p$ is more shielded than $2s$. So the $2p$ orbital energy is higher \rightarrow so the IE of a $2p$ electron is lower (more shielding)
C	6	$1s^2 2s^2 2p_x^1 2p_y^1$	IE of C $>$ IE of B, because of the increased effective nuclear charge
N	7	$1s^2 2s^2 2p_x^1 2p_y^1 2p_z^1$	IE of N $>$ IE of C, because of the increased effective nuclear charge
O	8	$1s^2 2s^2 2p_x^2 2p_y^1 2p_z^1$	IE of O $<$ IE of N, because pairing a $2p$ electron causes a large increase in electron/electron repulsion (increased electron/electron repulsion)
F	9	$1s^2 2s^2 2p_x^2 2p_y^2 2p_z^1$	IE of F $>$ IE of O, because of the increased effective nuclear charge
Ne	10	$1s^2 2s^2 2p^6$	IE of Ne $>$ IE of F, because of the increased effective nuclear charge
Na	11	$1s^2 2s^2 2p^6 3s^1$	IE of Na $<$ IE of Ne, because the Na valence electron is part of a new shell.
Mg	12	$1s^2 2s^2 2p^6 3s^2$	IE of Mg $>$ IE of Na, because of the increased effective nuclear charge.
Al	13	$1s^2 2s^2 2p^6 3s^2 3p_x^1$	IE of Al $<$ IE of Mg, because of more shielding
Si	14	$1s^2 2s^2 2p^6 3s^2 3p_y^1 3p_z^1$	IE of Si $>$ IE of Al, because of the increased effective nuclear charge
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