

Answer on the question #65571, Chemistry / Other

Question:

Give scientific reasons:(1)Electron affinity increases along a period.(2)First ionization potential value is smaller than second ionization value.(3)Na⁺,Mg⁺² and Al⁻³ are iso- electronic ions.

Answer:

- 1) Electron affinity is the tendency to attract and form bonds with electrons. The reasoning of this property is the electronic configuration of an atom. According to the octet rule, the complete outer electronic shell of the atom should contain 8 electrons. Then, the atoms with more than half-complete shell will tend to take electrons. As the number of the electrons in the outer shell increases along a period, the electron affinity does so.
- 2) An ionization potential is the energy required to remove the electron from the atom. The first ionization potential corresponds to removal of the first electron, while the second corresponds to removal of the second electron. Of course, when you remove an electron, the atom becomes positively charged (cation is formed). To remove second electron, you need to remove it from cation, while positive cation and negative electron will attract each other. Thus, second ionization potential will be higher than the first one.
- 3) Sodium cation has the following electronic configuration:
Na⁺ (11-1 electrons) $1s^2 2s^2 2p^6$
As well as Mg²⁺ and Al³⁺:
Mg²⁺ (12 -2 electrons) $1s^2 2s^2 2p^6$
Al³⁺ (13 - 3 electrons) $1s^2 2s^2 2p^6$