

## Electron Gain Enthalpy Chemistry Questions with Solutions

**Q1.** When the atomic radius increases, electron gain enthalpy \_\_\_\_.

- (a) Increase
- (b) Decrease
- (c ) No change
- (d) None of the above

**Answer:** (b) When the atomic radius increases, electron gain enthalpy decreases.

**Q2.** Which group of compounds have the largest electron gain enthalpy?

- (a) Alkali metals
- (b) Alkaline earth metals
- (c ) Halogen family
- (d) None of the above

**Answer:** (c ) Halogen family compounds have the largest electron gain enthalpy.

**Q3.** Which of the following factors affect the electron gain enthalpy of an element?

- (a) Nuclear charge
- (b) Atomic size
- (c ) Both (a) and (b)
- (d) None of the above

**Answer:** (c ) Nuclear charge and atomic size affect the electron gain enthalpy of an element.

**Q4.** Fluorine has a lower electron affinity than chlorine because of

- (a) Small size and high density of fluorine
- (b) Small size and high density of chlorine
- (c ) Large size and low density of fluorine
- (d) Large size and low density of chlorine

**Answer:** (a) Fluorine has a lower electron affinity than chlorine because of small size and high density of fluorine.

**Q5.** The electron gain enthalpy of metals is generally \_\_\_\_\_ non-metals.

- (a) Higher than
- (b) Lower than
- (c ) Similar to
- (d) None of the above

**Answer:** (b) The electron gain enthalpy of metals is generally lower than non-metals.

**Q6.** How does the electron gain enthalpy of the element alters when we move down the group?

- (a) Increase
- (b) Decrease
- (c) No change
- (d) None of the above

**Answer:** (b) The electron gain enthalpy of the element decreases when we move down the group.

**Q7.** What is electron gain enthalpy?

**Answer:** Electron gain enthalpy refers to the amount of energy released or absorbed when an electron is added to an isolated gaseous atom. Its unit is kJ/ mol.

**Q8.** Why is the electron gain enthalpy of chlorine more negative than fluorine?

**Answer:** The electron gain enthalpy of chlorine is more negative than fluorine because fluorine is much smaller than chlorine. There is strong interelectronic repulsion in the relatively small 2p orbitals of fluorine. Thus, the incoming electron will not experience much attraction. Hence, the electron gain enthalpy of chlorine is more negative than fluorine.

**Q9.** What are the various factors that affect the electron gain enthalpy of an element?

**Answer:** Electron gain enthalpy refers to the amount of energy released or absorbed when an electron is added to an isolated gaseous atom. Various factors that affect the electron gain enthalpy of an element are mentioned below.

1. Atomic Size
2. Nuclear charge
3. Electronic configuration

**Q10.** Why is electron gain enthalpy of noble gases positive?

**Answer:** The electron gain enthalpy of noble gases is positive because noble gases have completely filled valence orbitals, and there is no vacant space for additional electrons. Additional electron is placed in the subsequent higher orbital as energy is supplied for the addition of additional electrons. Thus, it is positive.

**Q11.** Why does electron gain enthalpy decrease down the group?

**Answer:** Electron gain enthalpy decreases down the group because as we move down the group, the size of an element increases, and the effective nuclear charge decreases. Due to this, the incoming electron will experience less attraction. Thus, electron gain enthalpy decreases as we move down the group.

**Q12.** How does electron gain enthalpy vary along the period?

**Answer:** The electron gain enthalpy increases as we move left to the right in the period. As we move left to the right in the period, the size of an element decreases, and the effective nuclear charge

increases. Due to this, the incoming electron will experience more attraction. Thus, electron gain enthalpy increases as we move left to the right in the period.

**Q13.** Distinguish between electron gain enthalpy and ionisation energy.

**Answer:**

S. No.	Electron Gain Enthalpy	Ionisation energy
1.	Electron gain enthalpy refers to the amount of energy released or absorbed when an electron is added to an isolated gaseous atom.	Ionisation energy refers to the amount of energy required by a gaseous atom to remove an electron from its valence orbital.
2.	Electron addition leads to the formation of a negatively charged chemical species.	Electron removal leads to the formation of a positively charged chemical species.
3.	It can be represented as $X(g) + e^- \rightarrow X^-(g)$ .	It can be represented as $M \rightarrow M^+ + e^-$ .

**Q14.** Why does electron gain enthalpy decrease with an increase in atomic size?

**Answer:** The electron gain enthalpy decreases with increased atomic size because as the size of an atom increases, the distance between the nucleus and the atomic shell increases. Due to this, the incoming electron will not experience any attraction. Thus, it will decrease with an increase in atomic size.

**Q15.** Why does electron gain enthalpy increase with an increase in nuclear charge?

**Answer:** The electron gain enthalpy increase with an increase in nuclear charge because as the nuclear charge increases, the incoming electron will experience a greater force of attraction. Thus, it will increase with an increase in nuclear charge.

## Practise Questions on Electron Gain Enthalpy

**Q1.** Name the element having the largest electron gain enthalpy in the periodic table?

**Answer:** Chlorine has the largest electron gain enthalpy in the periodic table.

**Q2.** What is the second electron gain enthalpy?

**Answer:** The electron gain enthalpy refers to the amount of energy released or absorbed when an electron is added to an isolated gaseous atom. Similarly, the second electron gain enthalpy refers to the amount of energy absorbed when an electron is added to a uni negative ion.

The second electron gain enthalpy is always positive.

**Q3.** Why is the second electron gain enthalpy of an element positive?

**Answer:** The second electron gain enthalpy refers to the amount of energy absorbed when an electron is added to a uni negative ion.

The second electron gain enthalpy of an element is always positive because, in it, an electron is added to a uni negative ion, and the electron will experience a repulsion from the uni negative ion, due to which energy has to be supplied.

Therefore, the addition of the second electron requires some energy, due to which the second electron gain enthalpy of an element is always positive.

**Q4.** Why is the electron gain enthalpy of a few elements of the 2nd period less negative than the corresponding elements of the third period?

**Answer:** The second-period elements have the smallest atomic size among the elements in their respective group. As a result, there are considerable strong interelectronic repulsions within the atom itself. Hence, the additional electron is not accepted with ease. Thus, the electron gain enthalpy of a few elements of the 2nd period is less negative than the corresponding elements of the third period.

**Q5.** Distinguish between electron gain enthalpy and electronegativity.

**Answer:**

S. No.	Electron Gain Enthalpy	Electronegativity
1.	Electron Gain Enthalpy is the change in enthalpy when a neutral atom or a molecule gains an electron from the outside.	Electronegativity is the ability of an atom to attract a shared pair of electrons.
2.	It is measured in kJ/mol.	It is unitless and is measured via a Pauling scale.
3.	It measures the amount of energy.	It measures the ability to gain an electron.
4.	It can either be negative or positive depending on the atom's electron configuration that will gain an electron.	It is always positive