

SUBJECT - CHEMISTRY

Page No - 01
Date 20.05.2020

CLASS - BSc (SUB/JOB) PART - I

GROUP - B

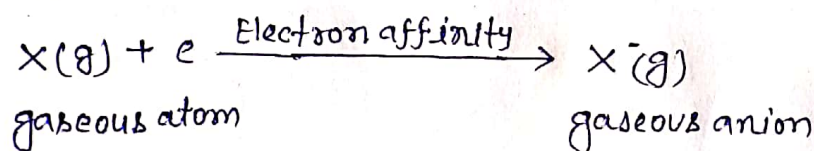
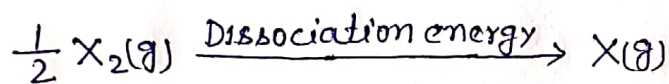
TOPIC - ELECTRON AFFINITY (EA)

Dr. Hare Mohan Prasad Singh

Department of Chemistry

Dr. L.K.V.D College, Tajpur, Samastipur

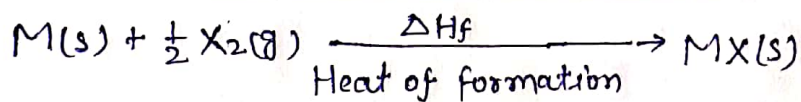
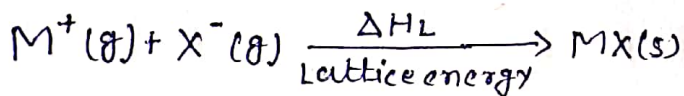
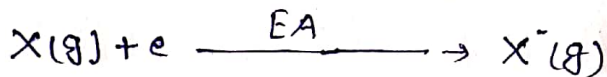
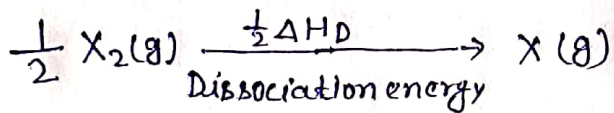
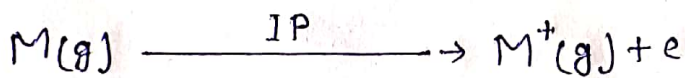
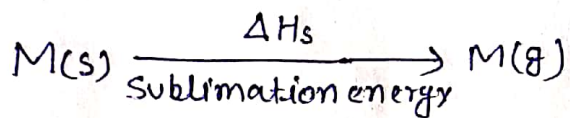
Electron Affinity (EA) Electron affinity of an element is the amount of energy released when an additional electron is taken up by an isolated gaseous atom of that element to form anion e.g



Electron affinity is now called enthalpy of electron attachment. It is denoted by EA. Therefore the EA value tells us regarding the formation of anion of the element. If EA value is low, the anion formation is difficult. If EA value is high, anion formation is easy. Since EA is an energy therefore it is expressed in kJ mol^{-1} . It increases across a period but decreases in moving down a group of the periodic table. It decides the non-metallic properties of elements to a great extent. The determination of EA value of elements is rather difficult because it is generally calculated indirectly e.g with the help of Born-Haber cycle.

Q Why chlorine has higher EA Value than fluorine ?

Ans Due to Smaller Size, the lone pair-lone pair repulsion is greater in fluorine and hence F_2 has lower dissociation energy than Cl_2 . That is why the EA value of F is lower than that of Cl because EA value is determined with the help of Born-Haber cycle:



And from Hess's law

$$\Delta H_f = \Delta H_s + IP + \frac{1}{2} \Delta H_D + EA + \Delta H_L$$

$$EA = \Delta H_f - [\Delta H_s + IP + \frac{1}{2} \Delta H_D + \Delta H_L]$$

Hence Cl has higher EA value than F.