Electron binding energy, ionization, excitation

The state of an atom with minimum energy is called the **ground state**. States with higher energies are excited or excited states. An atom reaches a higher energy level by absorbing energy equal to the difference between the basic and some higher levels (line absorption spectra).

During the transition to a lower energy level, the energy difference is emitted in the form of a [[photon (or photons, if the transition is in stages, from n=3 to n=2 and then to n=1). This action is the essence of luminescence.

Binding energy

Binding energy (Ev) is the work that must be done to push a particle to infinity - the place where no nuclear force will act on the particle.

Ev + E = 0 => Ev = – E

The electrons with the smallest n (principal quantum number), which are closest to the nucleus, have the highest binding energy.

Ionization potential

Ionization potential, i.e. energy that must be supplied to eject an electron from an atom. If an electron acquires such energy (e.g. by irradiation), then part of the energy is consumed for output work and the rest is transformed into the kinetic energy of the ejected electron:

h.f=Ev+1/2.mv2 (Einstein's relation for photo effect)

Ionization increases the total energy of the atom, thereby decreasing the negative energy of the electron. This consequently leads to instability. If an electron is ejected from a lower shell, the atom gets rid of energy by filling the lower levels with electrons from higher levels with the simultaneous emission of photons -> fluorescent radiation. If a valence electron is knocked out, the energy is reduced by the attachment of a free electron from the surroundings.

The potential barrier is the maximum value of the core potential. It is expressed in electron volts (eV).

Links

Source

- KUBATOVA, Senta. *Biofot* [online]. [cit. 2011-01-31]. <https://uloz.to/!CM6zAi6z/biofot-doc>.