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Deg III Chem. Hons, Paper – V

Topic :- Photo chemistry (Continued)

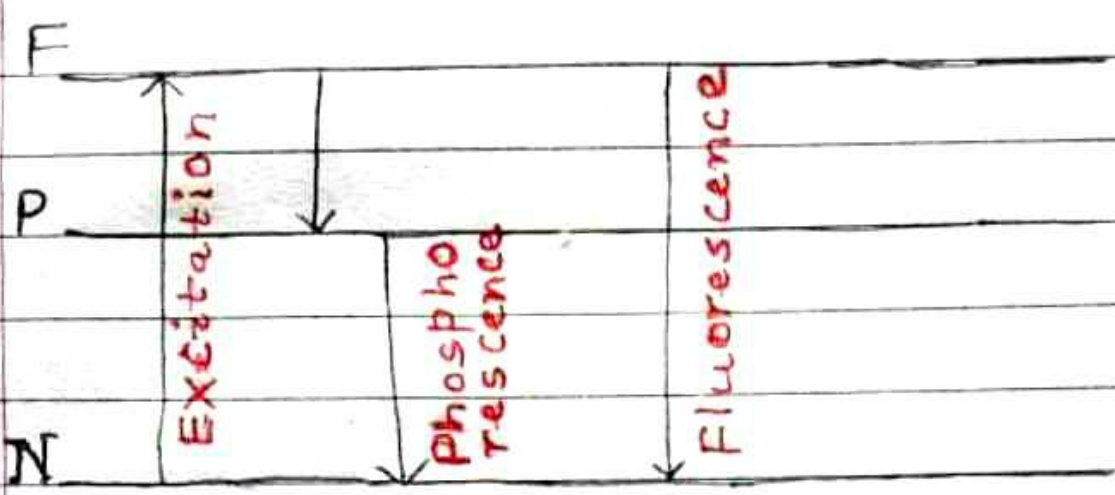
Phosphorescence :- The name Phosphorescence has been derived from Phosphorous which glow in dark. strictly speaking it is not Phosphorescence. It may be defined as

"When light radiation is incident on certain substances, they emit light continuously even after the incident light is cut off. This type of delayed fluorescence is called Phosphorescence and the substance is called Phosphorescent substance."

Examples :-

(1) The common substances which exhibit this Phosphorescence Phenomenon are sulphides of calcium, barium and strontium.

(2) Many organic substances Phosphorescence to emit a faint light. This is due to slow oxidation of organic substances.



Explanation :-

In the above figure N is the ground state of the molecule, F is the excited state involved in fluorescence and P is another excited state some what below the upper level F. The state P is involved in Phosphorescence.

When a Phosphorescent substance is exposed to light, its moleculesget excited from N → F state and not from N → P because the Probability of this is very low. These excited molecule can return to ground state but through following transition.

(1) F → N When excited molecules return from F → N state, the absorbed energy is given out in the form of radiations and thus Phosphorescence occurs.

(2) F → P

Under certain conditions, excited molecule may return from F → P state by emitting invisible infrared radiation.

(3) P → N

The Probability of P → N is very Low and so the molecules will have relatively long lives in the P-state.

Molecules which succeed in Passing back to N-state emit radiation and thus Phosphorescence occurs. Thus this Phenomenon will take Place very slowly and hence Persists fore Sometime