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Assignment => General Radiology.

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Question No 1

Difference b/w.

Calcium tungstate Screen :-	Rare-Earth Screen
(1) Atomic Number 74	(1) Atomic Number 57 - 71.
(2) slower then rare earth screen.	(2) Faster then calcium tungstate screen.
(3) DQE → Low DQE.	(3) DQE → High DQE.

(4) It is made up of Zinc sulphate Barium Sulphate.	(4) It is made up of Gadonalium Yttrium Latium.
(5) Low Conversion efficiency.	High Conversion efficiency.
(6) Slow Screen.	(6) Fast Screen.
(7) Continuous Spectrum.	(7) Line Spectrum.
(8) Safe light is blue Sensitive.	(8) Safe light is Red Sensitive.

(9) calcium tungstate Screen emit ~~blue~~ light in blue region.

(9) Rare Earth Screen emit light in green-Yellow region.

Question No: 2

Ans:

Latent image formation

=> The image forming x-ray exiting the patient and incident on the radiographic intensifying screen. film deposited visible light. energy in the emulsion primarily by interaction with atoms of silver halide crystal.

=> immediately after exposure no image can be observed

on film. An invisible image is present. However is called latent image. With proper chemical processing the latent image become visible.

=) The latent image is invisible change that is induced in the silver halide crystal.

=) Silver halide crystal

=) The silver, bromine and iodine atoms are fixed in crystal lattice in ion form.

=> Silver is positive ion. and bromide and iodide is negative ions.

=> When silver halide crystal is formed each silver atom release out-shell electron. which become attract to a halide atom.

=> An ion is an atom that too many or too few electron Therefore has electric charge.

=> The halide, iodine and bromide are generally found in greatest concentration along the surface

(u)

of crystal.

Therefore crystal takes on negative surface charge which is match positive charge of interstitial silver ions.

⇒ Frankel defect.

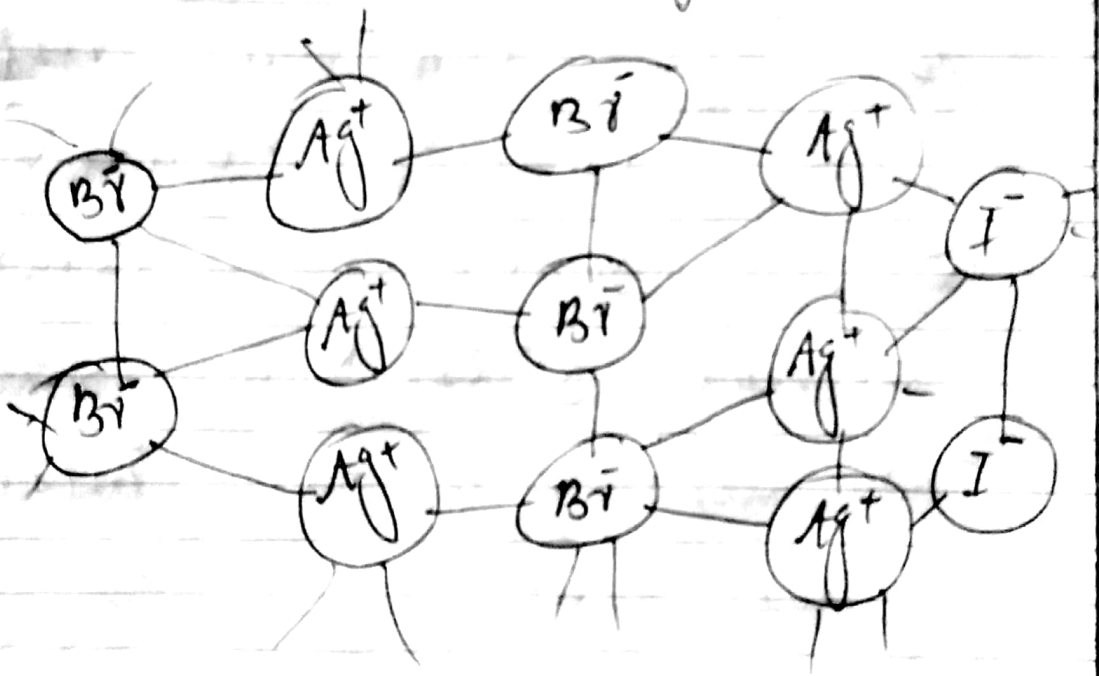
Consist of interstitial silver ions and silver in vacancies.

⇒ Photon interaction with silver halide crystal:-

→ When light photon from intensifying screen

interact with film

→ Interaction with Silver and halide atoms Ag, Br, I that form the latent image.



Secondary Electron formation

⇒ $Br^- + photon \longrightarrow Br + e^-$.

Production of latent image have Several Steps

(A) Light photon interact release electron.

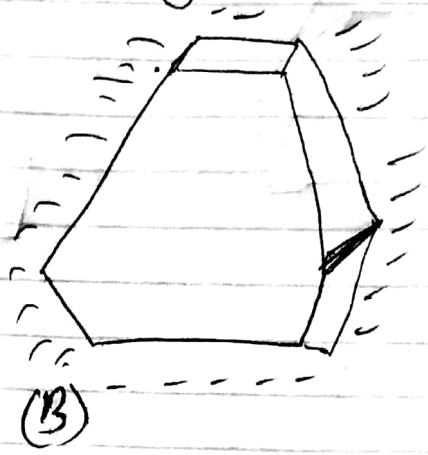
(B) These electron migrate to sensitivity center.

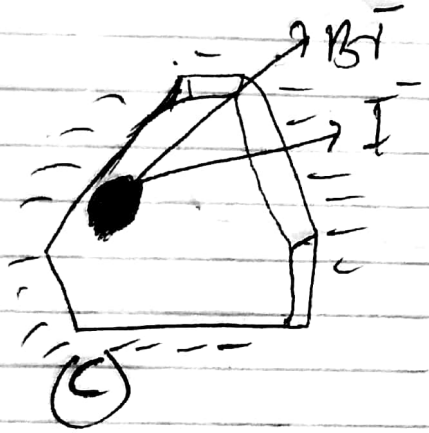
(C) At sensitivity center atomic silver is formed by attraction of interstitial silver ion.

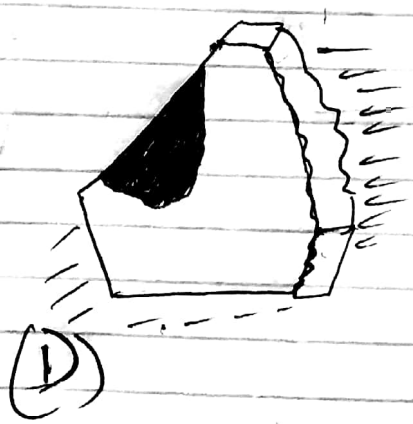
(D) This process is repeated many times. resulting in buildup of silver atoms

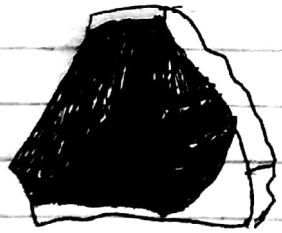
(E) The remaining silver halide is converted to silver during processing.

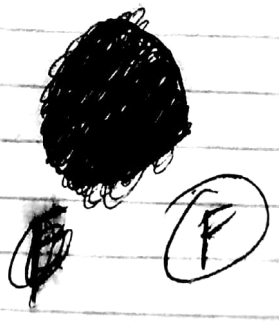
(F). The Silver grain result.











Question No 3

Construction of Radiographic films:

=) The Radiographic films have two parts.

(A) → Base.

(B) → Emulsion.

(A) **Base:-**

→ The base is the foundation of radiographic film.

=) Its primary purpose to provide rigidity structure.

onto which the emulsion can be coated.

⇒ The Base is flexible and fracture resistant to allow easily handling but it is rigid enough to be snapped into view box.

⇒ The base is approximately 150 to 300 µm thick,

→ Semirigid, lucent.

⇒ It is made up of polyester.

⇒ The base of radiographic film maintain its size and shape during use and

processing.

=> It does not contribute to image distortion.

=> The base have Dimensional Stability.

=> The base is uniform luency and nearly transparent to light.

=> The Dye is added to base of most radiographic film to slightly tint the film blue.

=> The orginal radiographic film base was Glass plate.

=> Radiologist use to refers to radiographs as x-ray plates

=> During world war I high quality glass became largely unavailable while medical application of x-rays particularly by military were increasing rapidly.

=> A substituent material cellulose nitrate soon be standard base. It was inflammable, improper storage and handling of some x-ray film files result in severe hospital fires during 1920. and early 1930.

⇒ In the Early 1960s a polyester base was introduced.

⇒ polyester has taken the place of cellulose triacetate.

⇒ polyester more resistant to film base Choice.

(B) Emulsion.

⇒ The emulsion is the heart of radiographic film.

⇒ It is a material in which x-ray light photons from radiographic intensifying screen interact.

=> The emulsion consist of homogeneous mixture of gelatin and Silver halide crystal.

=> It is coated with layer that is 3 to 5 um thick.

=> The gelatin is similar that used in salads and desserts but much more highest quality.

→ It transmit light

→ It is sufficiently porous for processing chemicals to penetrate to crystal of Silver halide.

=> The principal function of gelatin is to provide mechanical support for silver halide crystal by holding them uniformly dispersed in place.

=> The silver halide is active ingredient of radiographic emulsion.

=> 98% of silver halide is silver bromide.

=> High atomic number.

=> Silver halide crystal may have tabular, cubic, octahedral polyhedral or irregular shape.

⇒ Tabular grain are used in most of radiographs.

⇒ Tabular silver halide crystal are flat and typically 0.1 um thick with a triangular, hexagonal or polygonal section.

⇒ Adhesive layer :-

B/w the Emulsion and Base is a coating material called adhesive layer.

⇒ This layer allow the emulsion and base to maintain proper contact and integrity during use and processing.

Diagram of Radiographic film