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Paper = General Radiology

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Q:-

Ans Difference b/w Calcium tungustate and intensifyin screen:-

Using Calcium tangustate ($CaWO_4$) and rare-earth intensifying Screen's their relative relative Speeds where Compared in expoures of radiation a pelvis phantom, and at several doses were measured Slit pattern Kilovoltages. Using power was, the resolving a modified assessed by response and Contrast-frequency viewing of the by direct In the radiographic Comparsion of the rare earth and $CaWO_4$ Screen the following difference were found:

① A great reduction in the radiation dose can be achieved by the use of the fast screen types. Yet at the cost of some loss of resolving power.

② The film contrast can be improved by a reduction in the Kilovoltage without an increase in the radiation dose.

③ The short exposure times and the characteristic course of the dose curve necessitate an adjustment of the phototimer or change of controls units.

Calcium Tangstate	Rare Earth Screen.
1) Calcium tangstate Emits a broad blue Spectrum	1) Rare earth emits a green Spectrum.
2) in intensifying Screen made of rare earth oxide phosphor more efficent than Calcium tangstate.	2) in intesifying Screen made of Calcium Tangstate of rare earth oxide phosphar less efficint than rare Earth Screen.
3) Less or Slow Speed.	3) Fast Speed.
4) Each level is approximately towice is slow is : rare earth Screen.	4) Each level is approximatly towice as fast is a similar Calcium tangstate Screen

5) Sometime Detail is lost in Calcium Tangstate	5) Details is no lost in rare earth
6) Calcium tangstate emit blue light	6) Rare earth emit green lights
7) Less x-rays absorptions ability is compare of rare earth.	7) Higher X-rays absorption abilities
8) Have Lower Conversion efficency as compain to rare earth. Screen	8) Have higher Conversion efficency.
9) Frequent found in nature (compartively)	9) Infrequently found in nature.
10) Not used as often.	10) Most Common in use today

End of Question

QNo2:- . . . ?

Ans : **Definition:**

After exposure no image can be observed on the film, this invisible image is called latent Image. A proper chemical processing is needed to make image visible.

Explaniation:

The formation of the latent image or photographic effect is not yet well explored and still a subject of considerable research. There are many theories describing the formation of latent image, howev, it is the Gurney Mott Theory which is clearly simplified and is widely accepted.

① Radiation interaction releases electrons. The process begins when the incident photon (light on X-ray) interacts with one of the halides bromine or iodine) The interaction may be photoelectric, wherein x-rays are

totally absorbed: or Compton; wherein X-ray are partially absorbed.

2) These electrons migrate to the Sensitivity Centre. The ejected electron is freed to wander and may eventually and trapped in the Sensitivity. Centre or Sensitivity Speck which will turn the Speck into a nagative charge.

3) At the Sensitivity centre. atomic Silver is formed by attraction of an interstitial Silver ion. B/c the Sensitivity Center becomes eletrified it Causes to attract interstitial Silver ions (Silver is a positive ions).

4) The Silver ion neutralizes the Sensitivity Speck. The process is Known as ionic Stage.

5) The process is repeated Several time resulting in build up Silver atoms in the Speck.

6) The remaing Silver halide is Converted to black metallic Silver during processing

7) The Silver grain results.

End of Question.

Q:
Ans

(ii)

(ii)

(iii)

Q3 : — . . . ?

Ans : **Introduction :**

The X-Ray films, helps us to record, ~~help us~~ to record the information) regarding the object (tissue) through which the X-rays passes and hence they greatly help in diagnosis and traatment of the patient problems.

. Image recorded on film is caused by exposure to photons.

Explinations :

(i) **Base**

. It is a transparent supporting material.

(ii) POLYESTER POLYETYLENE TEREPHTHALATE RESIN are used in base of the film.

(iii) **Thickness** : 0.18 mm thickness of the base

(iii) **Properties of Base :**

↳ Structure Support for fragile emulsion.

2) Low light absorption : ~~Stained~~
3) Flexible, thick and Strong
4) Maintain Size and Shape.
5) Non-Flammable.

(2) ADHESIVE LAYER:

- Also called Subbing layer or Substratum layer.
- Made of mixture of gelatin Solution and Solvent of Film base
- It Keeps emulsion layer and base adhered to each other.
- Provides uniform Surface over which the emulsion can be coated uniformly.

(3) Emulsion Layer:

- Components
  - Silver halide grains.
  - Vehicle matrix.
- It consist of a homogeneous mixture of gelatin and Silver halide Crystals.
- In typical emulsion 90 to 99% is AgBr and about 1 to 10% AgI.

Formation of Silver halides

Dissolve Metallic Silver in nitric Acid
↓ to form
Silver nitrate
↓ by mixing

Silver nitrate + KBr = Ag - Br + protassium nitrate.

- Silver halide in a emulsion is the form of small Crystals.
- Silver halide Crystals may be tabular, globular, polyhedral, or irregular in Shape.
- Crystal Size might very from 1.0 - 15 micron in diameter with about 6.3×10^{11} grain per Centimeter of emulsion.

(B) D

Composition:

X-Rays film

- Base
  - Polyester
  - Polyethylene terephthalate
- Adhesive
- Emulsion
  - Silver halide grains
  - Vehicles matrix.