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Qr :-Ans Difference b/w Calcium tungstate and intensifying screen :-

Using Calcium tungstate (CaWO<sub>4</sub>) and rare-earth intensifying Screen's -their relative speeds where compared in exposures of a pelvis phantom, and radiation doses were measured at several kilovoltages. Using slit pattern, the resolving power was assessed by a modified contrast-frequency response and by direct viewing of the radiographic In the comparison of the rare earth and CaWO<sub>4</sub> 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 curve of the dose curve necessitate an adjustment of the phototimer or change of controls units.

**Calcium Tungstate Rare Earth Screen.**

- |   |   |
|---|---|
| 1) Calcium tungstate emits a broad blue spectrum  | 1) Rare earth emits a green spectrum.   |
| 2) in intensifying screen made of rare earth oxide phosphor, more efficient than Calcium tungstate. | 2) in intensifying screen made of calcium tungstate of rare earth oxide phosphor less efficient than rare earth screen. |
| 3) Less or slow speed.  | 3) Fast speed.  |
| 4) Each level is approximately twice as slow as rare earth screen.                                  | 4) Each level is approximately twice as fast as a similar calcium tungstate screen.                                     |



- |   |  |
|---|--|
| 3) Sometime Detail is lost in Calcium tungstate                     | 5) Details is no lost in rare earth    |
| 6) Calcium tungstate emit blue light                                | 7) Rare earth emit green lights        |
| 7) Less x-rays absorptions ability is compare of rare earth.        | 7) Higher x-rays absorptions abilities |
| 8) Have Lower Conversion efficiency as compare to rare earth screen | 8) Have higher Conversion efficiency.  |
| 9) Frequent found in nature (comparatively)                         | 9) Infrequently found in nature.       |
| 10) Not used as often   | 10) Most Common in use today           |

End of Question



Q NO<sup>2</sup>:-

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.

Explanation:

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, however, 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 or x-ray) interacts with one of the halides (bromine or iodine). The interaction may be photoelectric, when x-rays are



totally absorbed: or Compton,  
wherein x-ray are  
partially absorbed.

Q:  
Ans

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

3) At the Sensitivity centre atomic Silver is formed by attraction of interstitial Silver ion. B/c the Sensitivity Centre becomes electrified it causes to attract interstitial Silver ions (Silver is a positive ion).

4) The Silver ion neutralizes the Sensitivity Speck. The process is known as ionic stage. (i)

5) The process is repeated several times resulting in build up Silver atoms in the Speck. (ii)

6) The remaining Silver halide is converted to black metallic Silver during processing. (iii)

7) The Silver grain results.

End of Question.



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 treatment of the patient problems.

Image recorded on film is caused by exposure to photons.

## Explanations :

### (i) Base

it is a transparent supporting material.

### (ii) POLYESTER POLYETHYLENE

TEREPHTHALATE RESIN are used in base of the film.

(ii) Thickness : 0.18 mm thickness of the base

### (iii) Properties ~~are~~ of Base :

↳ Structure Support for fragile emulsion.



- 2) Low light absorption: ~~should~~
- 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.

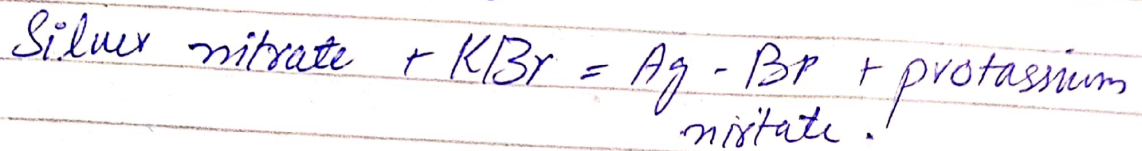
# Formation of Silver halides

Dissolve Metallic Silver in nitric Acid

↓ to form

Silver nitrate

↓ by mixing



- Silver halide in an emulsion is the form of small crystals.
- Silver halide crystals may be tabular, globular, polyhedral, or irregular in shape.
- Crystal size might vary from 1.0 - 1.5 micron in diameter with about  $6.3 \times 10^{11}$  grain per centimeter of emulsion.



Ⓟ D

Composition:

X-Rays film

