

## AbstractID: 11168 Title: Unerasable Latent Images Observed in Computed Radiography and Their Complete Erasing

**Purpose:** Some unexpected effects in Computed Radiography (CR) have become known, i.e., the phenomena of unerased and reappearing latent images, particularly for a film irradiated at high dose and/or a subsequently irradiated film. The aim was to evaluate the usefulness of our new erasing method to erase unerased and reappearing latent images in CR. **Method and Materials:** Several types of photo-stimulated luminescent (PSL) material, BaFBr:Eu<sup>2+</sup> were examined for properties of causing unerased latent images. PSL sheets were exposed to X-ray beams of 150 kV in the range 8.07 mGy - 24.2 Gy. After fully erasing with visible light, the latent images were read out by the stimulation of Eu<sup>2+</sup> luminescence with 633 nm He-Ne laser light of a conventional Fuji reader. Our new method of simultaneously exposing PSL sheets with an ultraviolet light and a fluorescent light has been applied to unerased latent images. UV lights (shorter than 270 nm) excite Eu<sup>2+</sup> ions, inducing strong luminescence. To avoid excitation of the Eu ion, we used ultraviolet light filtered by the UV-29 ultraviolet transmitting optical filter, which cuts out 50% of light at 290 nm, to do the erasing. **Results:** Unerased latent images were observed in all types of PSL sheets after X-ray irradiation. After repeated treatment by the new erasing method, unerased latent images were completely erased without reappearing PSL signals. Deep electron centers created by high X-ray irradiation or pre-existing centers may act as competitive trap centers to the F centers. Electrons from deep electron centers can be supplied to the F centers, causing unerased latent images. UV lights around 290 nm can excite the deep centers relevant to the unerased and reappearing PSL. **Conclusion:** The new erasing method can be used to erase unerased and reappearing latent images effectively, reducing artifacts and improving image quality in CR.