

## Image quality assessment of flexible scintillation screens for curved X-ray imaging detectors

Nowadays, the large-area flat panel imagers with TFT (thin film transistor) and CMOS (complementary metal-oxide semiconductor) process have been widely used in various X-ray medical imaging and non-destructive test (NDT) and security applications. Conventional flat-panel x-ray detector are manufactured using thin film transistor (TFT) processing on extremely large rigid glass substrates. Recently, a light and flexible array panel is being produced using a low-temperature TFT process on a thin plastic substrate that does not break. Research and development of large-area X-ray imaging detectors of curved and bendable types using new process manufacturing technologies are currently in active progress. Generally, scintillation materials are widely used as converters for X-rays into visible light in indirect X-ray imaging detectors. In this work, different flexible scintillation screens such as needle structured CsI:Tl with 200-700um thickness and granular Gd<sub>2</sub>O<sub>2</sub>S:Tb(GOS) materials with different mass density(140-250um thickness) on thin plastic substrates were used to prepared for curved X-ray imaging detectors. The used different flexible scintillation screens have a excellent X-ray energy absorption and green light emission wavelength and high spatial resolution properties. The various X-ray imaging performance such as X-ray linearity, signal to noise ratio, dynamic range, spatial resolution were measured and investigated. And quantitative image evaluation with X-ray phantom was studied in medical X-ray conditions. The dominant scintillation intensities of scintillating screens were clearly observed around green light emission wavelength (540-560nm).The X-ray images of both flexible CsI and Gadox scintillation screen showed sharper image and better spatial resolution. This paper will demonstrated the significant potential of flexible scintillation screens with high-resolution and high-sensitive for curved X-ray imaging detector.

### Submission declaration

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