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Scintillation characteristics and imaging performance of CsI:Tl thin films for X-ray imaging applications

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We have manufactured thallium doped cesium iodide (CsI:Tl) scintillator thin films by the thermal deposition method. The scintillation characteristics of the CsI:Tl thin films was studied by the X-ray induced luminescence and photoluminescence (PL) for different Tl doping concentrations between 0.1~10.0mol%. The wavelength of the main emission peak was about 550nm for both studies, but the light intensity dropped and the emission peak shifted toward the long wavelength for higher Tl concentration in X-ray luminescence case. X-ray diffraction (XRD) and scanning electron microscopy (SEM) for observation of structural properties was used to investigate the relationship between the microstructure affected by the evaporation condition and post-heat treatment, and the scintillation properties of samples. The imaging performance of the various CsI:Tl films fabricated will be also evaluated by X-ray radiographic test after coupling to a CCD sensor.

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