

**PRODUCTION AND DEVELOPMENT OF YTTRIUM TANTALATE NIOBATE  
( $YTa_{0.85}Nb_{0.15}O_4$ ) THIN FILM X-RAY PHOSPHOR VIA SOL-GEL TECHNIQUE**

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**ABSTRACT**

Monoclinic yttrium tantalate ( $M'$ - $YTaO_4$ ), yttrium niobate ( $YNbO_4$ ) and yttrium tantalate niobate ( $YTa_xNb_{1-x}O_4$ ) are efficient X-ray phosphors used in X-ray medical imaging, in which these phosphors are used in films/screen cassettes, and also in electronic detector systems such as computed radiography, computed tomography and fluoroscopy. Performances of these phosphors are related to composition, crystalline structure, surface properties and luminescence properties of films. In this study, yttrium tantalate niobate ( $YTa_{0.85}Nb_{0.15}O_4$ ) films were synthesized by five steps sol-gel spin coating route on single crystal silicon substrate. And then these films were dried at 120 °C and were sintered at 1200 °C for 4 hours and slowly cooled to room temperature. The obtained films were characterized by means of X-ray diffraction (XRD), X-ray photoelectron spectroscopy (XPS), scanning electron microscopy (SEM), atomic force microscopy (AFM), differential thermal analysis (DTA) and nanoindentation (with berkovich indenter). After sintering, monoclinic  $YTa_{0.85}Nb_{0.15}O_4$  phase was obtained.

**Keywords:** Radio luminescence, Thin film, Phosphors,  $YTaO_4$

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