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Luminescent properties of pulse laser deposition (PLD) thin films of SrGa2S4:Ce3+ coated with metallic TaSi2

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Abstract content
   (Max 300 words)

Cerium (Ce3+) doped SrGa2S4 is known to show bright blue luminescence. Under prolonged electron exposure electron stimulated surface chemical reactions (ESSCR) occur on the surface. Resulting in a high degradation rate of the luminescence intensity and desorbed gases which have a detrimental effect to the emitter tips of the field emission display (FED). Hence the use of thin luminescent films was considered. However, the sulfide thin films are still only exhibiting 40 - 75 % luminance brightness of the raw powder materials due to grain structure, stoichiometry and substrate roughness effects [1]. Several coating techniques have been developed by coating with conductive oxides such as MgO, SiO2, and SnO2 in trying to overcome the problem of degassing from the sulphide films [2]. In this study the films prepared from SrGa2S4:Ce3+ powder by pulsed laser deposition (PLD) technique were coated with metallic TaSi2. This material metallic features and unique properties such as high electrical conductivity and good chemical stability make it suitable material for use in application in field emission–emitter devices. Moreover, it is compatible to silicon substrate thus satisfying the requirements for the generation of nano-electronics [3]. In the present work, the effect of the substrate temperature on the structure, morphology and luminescent properties of the SrGa2S4:Ce3+ thin films coated with TaSi2 are presented. The X-ray diffraction (XRD) pattern showed broad peaks with the preferential growth along the (0 6 2) orientation. The highest PL intensity was demonstrated when 450°C substrate temperature was used. The colour purity of the SrGa2S4:Ce3+ powder was not entirely affected by the coating layer.

References
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