

Growth and Characterization of  
Thin Films of Rare-Earth Sulfides  
on Various Substrates

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We have used three different techniques (RF magnetron sputtering, e-beam evaporation, and thermal evaporation) to deposit thin films of rare-earth sulfides (LaS and NdS) on Si, InP, and GaAs substrates. The starting materials are bulk samples of rare-earth sulfides whose growth and characterization was recently reported in the literature [1]. The thin film samples are characterized using XRD, Raman, and SIMS techniques. The work function of the samples is also measured using a Kelvin probe technique. Thin films of rare-earth sulfides can lead to negative electron affinity at various semiconductor surfaces leading to stable cold cathode emission for vacuum microelectronics applications.

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[1] Y. Modukuru, J. Thachery, H. Tang, A. Malhotra, M. Cahay and P. Boolchand, "Growth and Characterization of Rare-Earth Monosulfides for Cold Cathode Applications", *Journal of Vacuum Science and Technology B* 19, pp.1958-1961 (2001).