

Abstract Submitted
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Simple synthesis of ultra-high quality In_2S_3 thin films on InAs substrates¹ YUMIN SIM, JINBAE KIM, MAENG-JE SEONG, Chung-Ang Univ — We report a simple and reliable technique to synthesize high-quality In_2S_3 films on device-ready substrate, such as InAs substrates for useful device applications, by using thermal sulfurization in a hot-wall tube furnace. The crystal structure and composition were studied by using X-ray diffraction and energy dispersive X-ray, and the results confirmed that the synthesized In_2S_3 films were cubic $\beta\text{-In}_2\text{S}_3$ or tetragonal $\beta\text{-In}_2\text{S}_3$, depending on growth conditions. Morphology, vibrational modes, and optical properties were investigated by using field emission scanning electron microscopy, Raman, and photoluminescence spectroscopy, and the results indicated that the In_2S_3 films are remarkable crystal quality with substantial efficiency in photoluminescence. Especially, by optimizing the growth conditions, we have grown an extremely high-quality tetragonal $\beta\text{-In}_2\text{S}_3$ thin film firmly remained on the InAs substrate, for the first time.

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