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The Growth of Semiconductor thin layer on Silicon Substrate Using Sol-Gel Method

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Abstract

The semiconductor galliumnitride (GaN) thin film was efficiently grown on the Si substrate with sol-gel method. The gel is prepared from gallium-citrate-amine crystals. These crystals are formed from a solution contains Ga +3 ions and citric acid (CA). The gel is placed on the substrate and then the substrate. The gel layers obtained are then rotated at a rate of 1100rpm programmable furnace. Deposition temperatures varied at 800°C, 900°C, and respectively 1000°C in a nitrogen gas environment within 2 hours. The results were characterized by XRD measurement. Surface morphology and cross-section of the film observed by SEM imaging, and film composition was determined by EDX characterization. Characterization Result showed that all GaN thin films deposited on the silicon substrate had polycrystalline orientation. The crystal quality of the GaN film formed is influenced by the deposition temperature. It is observed that by increasing the deposition temperature can improve quality of deposited GaN film crystals.

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