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Effect of post-deposition annealing on low temperature metalorganic chemical vapor deposited gallium oxide related materials

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Abstract

Low temperature metalorganic chemical vapor deposition using trimethylgallium and water was investigated. The surface morphology of the film was almost flat at a deposition temperature below 182 °C. This flat film was a mixture of nanocrystalline and amorphous phase. The film deposited at a temperature of 272 °C resulted in a nanowire structure. X-ray diffraction measurements revealed that the nanowire film was a mixture of gallium hydroxide, gallium oxyhydroxide, and gallium tohdite or gallium oxide. We also found that post-deposition annealing above 600 °C significantly changed the crystal structure of the both flat and nanowire films. Monoclinic gallium oxide phase was dominant after the post-deposition annealing above 600 °C.

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