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学位 (博士) 論文要旨

(Doctoral thesis abstract)

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論文題目 (Title)	A study on growth by tri-halide vapor phase epitaxy for III-nitride and III-sesqui oxide semiconductor
<p>This thesis is made of two parts.</p> <p>Part I of this thesis consists of 5 chapters and the contents are as follows: Chapter 2 describes the details of the experimental procedure and equipment. Selective generation of metal tri-chlorides inside the reactor is discussed by thermodynamic analysis. the author optimized the generation condition of metal tri-chlorides. In chapter 3, the lattice-relaxed thick InGaN grown on an N-polar freestanding GaN substrate by THVPE is described. The lattice relaxation of the InGaN layer is controlled by the double intermediate InGaN layer, one is grown at a low speed, and the other is grown at a high speed. Chapter 4 describes the lattice-relaxed thick InGaN with high crystalline quality grown on the patterned sapphire substrates (PSSs). An important role of the GaN intermediate layer between the InGaN epilayer and the PSS to obtain high crystalline quality InGaN layer is described here. Finally, chapter 5 serves as the summarization and conclusion.</p> <p>In this thesis, the first Ga₂O₃ growth by THVPE is demonstrated. This thesis consists of 4 chapters and the contents are as follows: Chapter 7 describes the details of the experimental procedure and equipment. Selective generation of metal tri-chlorides inside the reactor is discussed by thermodynamic analysis. the author optimized the generation condition of metal tri-chlorides. Chapter 8 discussed the possibility of Ga₂O₃ growth by THVPE. The first β-Ga₂O₃ growth using gallium tri-chloride as a precursor of gallium source on the c-plane sapphire substrate was investigated and compared with β-Ga₂O₃ growth by HVPE. Finally, chapter 9 serves as the summarization and conclusion.</p>	