

# Accepted Manuscript

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PII: S0925-8388(18)33470-4

DOI: [10.1016/j.jallcom.2018.09.230](https://doi.org/10.1016/j.jallcom.2018.09.230)

Reference: JALCOM 47649

To appear in: *Journal of Alloys and Compounds*

Received Date: 18 July 2018

Revised Date: 13 September 2018

Accepted Date: 18 September 2018

Please cite this article as: H. Son, D.-W. Jeon, Optimization of the growth temperature of  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> epilayers grown by halide vapor phase epitaxy, *Journal of Alloys and Compounds* (2018), doi: <https://doi.org/10.1016/j.jallcom.2018.09.230>.

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# Optimization of the growth temperature of $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> epilayers grown by halide vapor phase epitaxy

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## ABSTRACT

We report the optimized temperature for the growth of  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> on  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> substrate using halide vapor phase epitaxy. The  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> layer grown at 470 °C exhibited the lowest full-width-at-half-maximum values for the (0006) and (10-14) peaks in the X-ray omega-scan rocking curve, which confirmed that the growth temperature strongly influenced the phase transition of Ga<sub>2</sub>O<sub>3</sub> and affected the crystal quality of the  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> epitaxial layers. In addition, the impurity concentration in this  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> epilayer as determined by secondary ion mass spectroscopy was found to be in the range of 10<sup>16</sup>-10<sup>18</sup> cm<sup>-3</sup>.

**Keywords :**  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub>, HVPE, phase transition, growth temperature

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