High Electron Mobility Al\textsubscript{x}Ga\textsubscript{1-x}N/GaN Heterostructures Grown by PAMBE on GaN Templates Prepared by MOCVD\textsuperscript{1} YEN-LIANG CHEN, WEN-YUAN PANG, MING-HONG GAU, YU-CHI HSU, WANT-SANG WANG, JIH-CHEN CHIANG, IKAI LO, Department of Physics, National Sun Yat-Sen University, Kaohsiung, Taiwan, R.O.C., CHIA-HO HSIEH, Institute of Material Science and Engineering, National Sun Yat-Sen University, Kaohsiung, Taiwan., JENN-KAI TSAI, Department of Electronic Engineering, National Formosa University, Yunlin, Taiwan, ROC. — A series high mobility Al\textsubscript{x}Ga\textsubscript{1-x}N/GaN heterostructures samples were grown on MOCVD-grown GaN templates by molecular beam epitaxy with different Al fractions (x = 0.017~0.355). The highest mobility in this series samples at liquid nitrogen temperature is 14110 cm\textsuperscript{2}/Vs with carrier concentration 2.87 x 10\textsuperscript{12} cm\textsuperscript{-2} and Al fraction x = 0.022. In our experiments, the carrier density decreases as Al content reduces. While the carrier density decreases from 1.54 x 10\textsuperscript{13} cm\textsuperscript{-2} to 2.87 x 10\textsuperscript{12} cm\textsuperscript{-2}, the mobility increases. But as the carrier density decreases from 2.87 x 10\textsuperscript{12} cm\textsuperscript{-2}, the mobility decreases.

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