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Magneto-transport Study on the nanometer-scaled wires made of $\text{Al}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ heterostructures WEN-YUAN PANG, IKAI LO, YU-CHI HSU, YEN-LIANG CHEN, MING-HONG GAU, W.S. LIN, C.H. CHEN, J.C. CHIANG, Department of physics, National Sun Yat-sen University, Kaohsiung, Taiwan, Republic of China, JEN-KAI TSAI, Center for General Education, National Formosa University, Yunlin, Taiwan, Republic of China — The electronic characteristics of nano-wires made of high-mobility $\text{Al}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ heterostructures have been studied. The $\text{Al}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ samples were grown on GaN-template buffer layer by plasma-assisted molecular beam epitaxy. We obtained the mobility and carrier density of two-dimensional electron gas to be $9328 \text{ cm}^2/\text{Vs}$ and $7.917 \times 10^{12} \text{ cm}^{-2}$ by conventional van der Pauw Hall measurement at temperature of 77K, respectively. We prepared the samples of field-effect-transistors and reduced the width of the conducting channel from $1 \mu\text{m}$ to 100 nm by Focus Ion Beam. The Shubnikov-de Haas oscillations were observed by magneto-resistance measurement at 0.3 K and the electronic properties for the samples of different channel widths were under investigation.

Wan-Tsang Wang
Department of Physics, National Sun Yat-sen University,
Kaohsiung, Taiwan, Republic of China

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