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Magneto-Transport Study of Undoped and Fe-doped AlGa_xN/GaN YING-CHIEH WANG, IKAI LO, MING-HONG GAU, Department of physics, National Sun Yat-sen University, Kaohsiung, Taiwan ROC, THOMAS AGGERSTAM, SEBASTIAN LOURDUDOSS, KTH Royal Institute of Technology, Electrum 229, SE-164 40 Kista, Sweden — The beating pattern of Shubnikov-de Haas oscillations for six samples of AlGa_xN/GaN heterostructures due to the spin-splitting of 2DEG have been observed. Two series of samples grown by metal-organic vapor phase epitaxy (MOVPE) were used in the study. One is undoped Al_xGa_{1-x}N/GaN with different x values (x= 0.17, 0.29, 0.33), and the other is Fe-doped Al_xGa_{1-x}N/GaN with the x values of 0.18, 0.19 and 0.21. The Shubnikov-de Haas measurements were performed at T = 0.3K for the magnetic field from 0.25 to 12 Tesla. The persistent photoconductivity (PPC) effect was used to vary the carrier concentration of the samples. The largest spin-splitting energy was observed on the sample of Fe-doped Al_{0.21}Ga_{0.79}N/GaN to be 5.96meV. After extended illuminated time, the carrier concentration of Fe-doped AlGa_xN/GaN increased at least 23%; meanwhile the undoped AlGa_xN/GaN just produced 10.7% increment at most. We found that the Fe-doped AlGa_xN/GaN exhibited higher PPC effect than the undoped samples.

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