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2- μm thick GaN epilayer was prepared, and 80 KeV Co⁻ ions with a dose of $3 \times 10^{16} \text{ cm}^{-2}$ were implanted into GaN at 350 °C. The implanted samples were post annealed at 700 °C. We have investigated the magnetic and structural properties of Co ion-implanted GaN by various measurements. HRXRD results did not show any peaks associated with second phase formation and only the diffraction from the GaN layer and substrate structure were observed. SIMS profiles of Co implanted into GaN before and after annealing at 700 °C have shown a projected range of $\sim 390 \text{ \AA}$ with 7.4% concentration and that there is little movement in Co. AFM measurement shows the form of surface craters for 700 °C-annealed samples. The magnetization curve and temperature dependence of magnetization taken in zero-field-cooling (ZFC) and field-cooling (FC) conditions showed the features of superparamagnetic system in film. XPS measurement showed the metallic Co 2p core levels spectra for 700 °C-annealed samples. From this, it could be explained that magnetic property of our films originated from Co magnetic clusters.

Key words : magnetic semiconductor, ion implantation