

The Surface Modification of $\text{Al}_2\text{O}_3(0001)$ by N_2^+ ion beam

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The surface of single crystal $\text{Al}_2\text{O}_3(0001)$ substrate was modified by N_2^+ ion-beam using cold hollow cathode or High Frequency broad-beam source. The energy of ion beam was changed in the range of 300-1000 eV and the dose was fixed about $1 \times 10^{16}/\text{cm}^2$. Any peaks related to nitrogen bonding was not found until 500 eV irradiation in N_{1s} XPS core-level spectra, but those related to AlON and AlN appeared clearly, and the binding energy difference was about 6 eV. In order to find the possibility as the buffer layer for direct GaN growth, GaN was grown on these substrate. The crystalline structure and PL intensity of GaN grown over modified surface were studied.