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Surface morphology of Al0.3Ga0.7N/Al2O3-High Electron Mobility Transistor structure

Author(s): Corekci S (Coerekci, S.), Usanmaz D (Usanmaz, D.), Tekeli Z (Tekeli, Z.), Cakmak M (Cakmak, M.), Ozcelik S (Oezcelik, S.), Ozbay E (Oezbay, E.)

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Abstract: We present surface properties of buffer films (AIN and GaN) and Al0.3Ga0.7N/Al2O3-High Electron Mobility Transistor (HEMT) structures with/without AIN interlayer grown on High Temperature (HT)AIN buffer/Al2O3 substrate and Al2O3 substrate. We have found that the GaN surface morphology is step-flow in character and the density of dislocations was about 10(8)-10(9) cm(-2). The AFM measurements also exhibited that the presence of atomic steps with large lateral step dimension and the surface of samples was smooth. The lateral step sizes are in the range of 100-250 nm. The typical rms values of HEMT structures were found as 0.27, 0.30, and 0.70 nm. HT-AIN buffer layer can have a significant impact on the surface Morphology of Al0.3Ga0.7N/Al2O3-HEMT structures.

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Addresses: Cakmak, M (reprint author), Gazi Univ, Dept Phys, TR-06500 Ankara, Turkey
Gazi Univ, Dept Phys, TR-06500 Ankara, Turkey
Nanotechnol Res Ctr, Dept Phys, TR-06800 Ankara, Turkey
Nanotechnol Res Ctr, Dept Elect & Elect Engn, TR-06800 Ankara, Turkey

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