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Vertical Atom Manipulation on GaN(000 $\bar{1}$) Surface at Low Temperature DANDA P. ACHARYA, KENDAL CLARK, SAW W. HLA, OU — We report single atom manipulation on a GaN(000 $\bar{1}$) surface at 4.6 K by using a low temperature scanning tunneling microscope (STM) tip. The nitrogen polar Ga rich GaN samples are grown on sapphire substrate by using r.f. N-plasma molecular beam epitaxy (MBE). Low temperature STM images of GaN (000 $\bar{1}$) surface reveal a novel reconstruction with a basis of 12 x 12 unit cell. For the manipulation experiment, the STM tip is first coated with Ga atom by using a controlled tip-sample contact. Using a vertical manipulation technique with the STM-tip, individual Ga atom from the tip is transferred to the GaN (000 $\bar{1}$) surface on one atom-at-a-time basis. The successful atom deposition is conformed by subsequent STM imaging. Here, the controlled STM tip-sample contact plays a crucial role in an atom deposition process. This procedure allows construction of nanostructures on a MBE grown semiconductor surface with atomic scale precision. This work is financially supported by a NSF-NIRT grant no. DMR-0304314.

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