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(54) **PROPAGATION OF MISFIT DISLOCATIONS FROM BUFFER/SI INTERFACE INTO SI**

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(52) **U.S. Cl.** . **438/604**; 438/481; 438/514; 257/E33.023; 257/E33.025; 257/E21.085

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See application file for complete search history.

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(57) **ABSTRACT**

Misfit dislocations are redirected from the buffer/Si interface and propagated to the Si substrate due to the formation of bubbles in the substrate. The buffer layer growth process is generally a thermal process that also accomplishes annealing of the Si substrate so that bubbles of the implanted ion species are formed in the Si at an appropriate distance from the buffer/Si interface so that the bubbles will not migrate to the Si surface during annealing, but are close enough to the interface so that a strain field around the bubbles will be sensed by dislocations at the buffer/Si interface and dislocations are attracted by the strain field caused by the bubbles and move into the Si substrate instead of into the buffer epi-layer. Fabrication of improved integrated devices based on GaN and Si, such as continuous wave (CW) lasers and light emitting diodes, at reduced cost is thereby enabled.

8 Claims, 11 Drawing Sheets

