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Redirecting of misfit dislocations from AlN/Si interface into the substrate[1] Z. LILIENTAL-WEBER, Lawrence Berkeley National Laboratory, Berkeley, Ca, R.L. MALTEZ, Instituto de Fisica, Porto Alegre-RS, Brazil, X. NI, H. MORKOC, Virginia Commonwealth University, Richmond, VA, LAWRENCE BERKELEY NATIONAL LABORATORY COLLABORATION, INSTITUTO DE FISICA COLLABORATION, VIRGINIA COMMONWEALTH UNIVERSITY COLLABORATION — In order to increase lifetime of CW lasers based on the III-nitrides, a low defect density in GaN/AlN based materials is required. For the first time it was shown that misfit dislocations formed at the AlN/Si interface can interact with dislocation loops formed around He bubbles created by He implantation into Si, and dislocations can move into the Si substrate instead of into the epi-layer. The optimal implantation dose and the distance of the He bubbles from the surface were determined. The growth temperature of AlN was used as the annealing temperature. Understanding of physical basis of strain relaxation at the AlN/Si interface can lead to the development of techniques leading to annihilation of threading dislocations in the GaN/AlN layers grown on foreign substrates.

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