Membrane-assisted revelation of the spatial nanoarchitecture of dislocation networks

Ion Tiginyanu, Veaceslav Popa, Marion A. Stevens-Kalceff

Abstract

We propose a method of direct visualization of the spatial nanoarchitecture of dislocation networks which is based on etching away the regions with low density of structural defects from the bulk of GaN epilayers, keeping intact only the threading dislocations and a thin surface film pre-treated with low-energy Ar+ ions. The formation of nanometer-thick suspended membrane to which the dislocations are genetically attached provides conditions for the revelation of the spatial nanoarchitecture of dislocation networks using conventional scanning electron microscopy. Complementary monochromatic and panchromatic micro-cathodoluminescence images are presented.