Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

3D Mapping of Strain and Dislocation Gradients near Surfaces and Interfaces via Polychromatic Microdiffraction[1] ROZALIYA BARABASH, GENE ICE, Oak Ridge National Laboratory — The results of 3D polychromatic X-ray microbeam analysis (PXM) of strain and dislocation gradients are presented. Two examples are considered: (1) FIB machined nano-size trenches in thin GaN/InGaN multylayers; (2) natural nanosize Mo pillars in the NiAl matrix of the eutectic composite alloy. Position sensitive d-spacings were obtained from Laue patterns. The PXM results show that FIB induces structural changes and *lattice rotations* in the InGaN/GaN layer not only in the immediate trench region but in the surrounding area as well. For embedded nanosize Mo fibers, the measured elastic strain is consistent with the predicted thermal mismatch strain between the NiAl and Mo phases. However, when the NiAl matrix is etched back to expose Mo micro-pillars, the d-spacing increases to that of unconstrained Mo, indicating release of the compressive residual strain in the Mo fibers.

[1]Research is sponsored by the Division of Materials Sciences and Engineering, Office of Basic Energy Science, U.S. Department of Energy.

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Date submitted: 14 Nov 2008 Electronic form version 1.4