Abstract Submitted
for the TSF07 Meeting of
The American Physical Society

Deuterium Depth Profiling of Semiconductor Devices Using the ^{3}He(d,p)^{4}He Reaction L.C. PHINNEY, M. DHOUBADEL, J.L. DUGGAN, University of North Texas, O.W. HOLLAND, Amethyst Research, Incorporated, F.D. MCDANIEL, University of North Texas — The non-resonant reaction, ^{3}He(d,p)^{4}He, is commonly used to determine the depth profile of deuterium in various materials such as group II-VI and III-V semiconductors. While deuterium can passivate electrically-active defects in materials, the 'decoration' or tagging of defects by deuterium provides a simple method for defect profiling. This is important in many materials, such as HgCdTe, CdTe, and GaN, whose properties are substantially degraded by a high-density of as-grown defects. Thus, NRA of deuterated material was investigated to determine its efficacy in analysis of defect profiles, i.e. the concentration and location of the defects. We have demonstrated that the ^{3}He-D reaction accurately predicts the total deuterium in samples. Results were obtained using a 640 keV ^{3}He beam and a large solid-angle detector to count the reaction products, i.e. p, and ^{4}He. Results will be presented, which were obtained using detectors of different thicknesses. Both standards and computer simulations were used to normalize our results.

Lucas Phinney
University of North Texas

Date submitted: 05 Oct 2007 Electronic form version 1.4