Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Nanocrystal Ghosting: Extensive radiation damage in MgO induced by low-energy electrons WILLIAM SAWYER, ZACHERY FRANKENFIELD, Deptment of Physics, West Chester University, KENNETH KANE, Deptment of Physics, Virginia Commonwealth University — Radiation damage in magnesium oxide has been an ongoing source of investigation. Early work was motivated by its simple cubic structure and its excellent electrical insulating properties over a wide range of temperatures and mechanical conditions. The goal was to determine its suitability as an electrical insulator in radiation intense environments including nuclear reactors and proposed nuclear fusion devices. During this period experimental results for irradiation of MgO using electrons with energies less than 500 keV produced very limited damage. These results, supported by theoretical arguments, lead to the conclusion that MgO was relatively impervious to damage from electrons with energies below this threshold. More recently its excellent insulating properties and relative mechanical stability combined with an increased interest in nanomaterials applications have created renewed interest in MgO. In this paper direct evidence is presented for extensive radiation damage in MgO nanocrystals from intense irradiation by electrons (2 x 10^{4} electrons/nm^2 sec) with beam energies between 120 keV and 60 keV.

William Sawyer
Department of Physics West Chester Univ

Date submitted: 05 Nov 2015 Electronic form version 1.4