[Nano device]

SEMICONDUCTOR DIELECTRIC INTERFACES AND DEFECT PASSIVATION

L.C. Feldman
Dep't. of Physics and Astronomy, Vanderbilt University
Nashville, TN, USA 37235
Solid State Division, Oak Ridge National Laboratory
Oak Ridge TN, USA 37835

The "heart" of the semiconductor revolution has been the control of the interface between the semiconductor and the gate dielectric. This talk will consider three components of this famous problem. 1) The structure of the silicon/silicon dioxide interface and its role in future silicon technology; 2) Progress in the control of the wide band-gap SiC/SiO_2 interface, enabling high power/high temperature MOSFETs[1] and 3) The use of hydrogen for defect passivation and the role of hydrogen vibrational dynamics in governing device reliability and longevity.[2]

[References]

1. G.Y. Chung, C.C. Tin, J.R. Williams, K. McDonald, M. Di Ventra, S.T. Pantelides, L.C. Feldman and R.A. Weller, Appl. Phys. Lett., 76, 1713 (2000).
2. M. Budde, G. Lupke, C.Parks-Cheney, N.H.Tolk and L.C. Feldman, Phys. Rev. Let, 85, 1452 (2000).