

A13 (분과초청강연)

SELECTIVE AREA DEPOSITION OF BORON AND DELTA DOPING OF SILICON BY SYNCHROTRON RADIATION FOR ULSI APPLICATION; Sunwoo Lee, Samsung Electro-Mechanics Co., Research & Development Center, Laboratory for Thin Film Devices, Suwon, Kyungki-Do 441-743, Korea; Peter A. Dowben, University of Nebraska, Department of Physics and Center for Materials Research & Analysis, Lincoln, Nebraska 68599-0111, U. S. A.

We have used broadband synchrotron radiation to induce selective area deposition and surface doping of boron into silicon. Contamination-free thin films were grown at room temperature using *nido*-decaborane ($B_{10}H_{14}$) as the source gas. After deposition the films were examined using photoelectron microscopy, which showed that film growth was limited to the region illuminated by synchrotron radiation. For delta doping, the source gas was adsorbed on Si(111) at 100 K. Irradiation caused decomposition of the adsorbed molecule which lead to an enhanced concentration of free boron in the irradiated area. Using Si 2p core level photoelectron spectroscopy, the surface chemical composition and Fermi level position in both the irradiated and unirradiated regions were determined. The present work is demonstrating that the synchrotron radiation may eventually lead to selective area deposition and surface doping for the ULSI process.