



BILKENT UNIVERSITY

unam - INSTITUTE of MATERIALS SCIENCE & NANOTECHNOLOGY

FACULTY OF SCIENCE

**MATERIALS SCIENCE and NANOTECHNOLOGY
GRADUATE PROGRAM SEMINAR**

“Growth of Epitaxial Silicon-on-Insulator Substrates by Solid State Epitaxy”

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The growth of monolithically integrated, epitaxial silicon-on-insulator substrates by using single crystal rare earth oxide (REO) insulator layers is presented. The growth of epitaxial single crystal rare earth oxides on silicon is possible due to the unique matching of the lattice parameters of REOs and that of silicon. Insulator layers are grown in a solid state epitaxy (SSE) chamber using elemental sources for metals and molecular oxygen at pressures as high as 8×10^{-6} torr. In this particular case the choice of insulator is Gd_2O_3 due to the ease of composition control and close lattice matching to silicon. In-situ reflectometry and in-situ composition monitoring can be performed during the process as necessary. Thickness of the insulator layer can be 0.05 to 0.3 μm depending on the requirements of the final product. REO insulator layers are characterized by X-ray reflectivity, high resolution x-ray diffraction and AFM all of which indicate smooth surfaces and sharp interfaces between the insulator and the silicon substrate. Further growth of silicon overlayers on the REO insulator template is performed in-situ from a silicon ingot using e-beam evaporation. The resulting silicon overlayers exhibit shiny surfaces and smooth morphologies as verified by RHEED and AFM and are suited for further device fabrication. Silicon overlayers can be grown as thin as 0.5 μm .

Date : July 02, 2010 (Friday)

Time : 15:40

Place : Faculty of Science Building, A Block, Seminar Room (SA 240)

Tea will be served after the seminar