Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Chemical vapor deposition of SiGe alloy nanowires S.G. CHOI, Los Alamos National Laboratory, T. CLEMENT, Arizona State University, S.T. PICRAUX, Los Alamos National Laboratory — We present chemical vapor deposition synthesis of $Si_{1-x}Ge_x$ nanowire alloys on Si substrates via vapor-liquid-solid (VLS) mechanism. Silane and germane were employed as source materials and self-assembled gold nanoparticles were used as the catalyst. We discuss the compositional dependence on precursor partial pressures and temperature. We investigated effects of the growth temperature and the process gas flow rate on surface morphology, microstructure, and compositional uniformity of the grown nanowires. Initial nucleation time and the nanowire growth rate were monitored *in-situ* optical reflectivity. We discuss the compositional dependence on precursor partial pressures and temperature. Primary goal of this study is to achieve high crystalline quality $Si_{1-x}Ge_x$ nanowire alloys with large range of compositions (x) and to establish abrupt interface between Si and $Si_{1-x}Ge_x$ layers in nanowire axial heterostructures, so that we can engineer the bandgap energies for versatile nanowire-based advanced electronic, photonic, and thermoelectric devices.

Sukgeun Choi
Los Alamos National Laboratory

Date submitted: 20 Nov 2006 Electronic form version 1.4