Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Atomic analyzis and photocurrent studies of isolated sub-100 nm diameter silicon nanowires DIDIER STIEVENARD, CNRS - ISEN, TAO XU, ISEN, BRUNO GRANDIDIER, CNRS - ISEN, YANNICK LAMBERT, ISEN, CHRISTOPHE KREMINSKY, CNRS - ISEN, ABDELLATIF AKJOUJ, YAN PENNEC, BAHRAM DJAFARI-ROUHANI, Universite de Lille 1, WANGHUA CHEN, RODRIGUE LARDE, EMMANUEL CADEL, PHILIPPE PAREIGE, CNRS INSA Universite de Rouen, PHYSICS GROUP TEAM, PHYSICS OF MATERIALS GROUP TEAM — n-doped Si NWs were synthesized by the vapor-liquid-solid mechanism using the chemical vapor deposition (CVD) technique.The nanowires were grown to a nominal length of 10 μm with a diameter ranging typically from 60 to 110 nm. Atom Probe Tomography analyzes evidence a gradient of concentration of the phosphorous atom dopants, inducing a built-in potential accros the nanowires. Photocurrent on isolated nanowires was performed with a monochromator source. Depending on the light energy and on the nanowire diameters, we measure various absorption thresholds. Calculations have been performed on a periodic array of wires of varying diameters and with different periodicity by using a Finite Difference Time Domain (FDTD) method. The results evidence a clear dependence of the optical absorption with the nanowire diameters. This work was supported by DGA REI contract N $^{\circ}$ 2008.34.0031.

Didier Stievenard
CNRS - ISEN

Date submitted: 27 Oct 2010 Electronic form version 1.4