Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Optical Switching of Porphyrin-Coated Silicon Nanowire Field Effect Transistors VINCENT BOUCHIAT, Neel Institute, CNRS-Grenoble, CLEMENS WINKELMANN, CNRS-Grenoble, IRINA IONICA, IMEP-MINATEC, XAVIER CHEVALIER, CHRISTOPHE BUCHER, GUY ROYAL, LEOPR — We study [1] porphyrin coated silicon nanowire field effect transistors, which display a large, stable and reproducible conductance increase upon illumination. The efficiency and the kinetics of the optical switching are studied as a function of gate voltage, illumination wavelength and temperature. The decay kinetics from the high- to the low-conductance state is governed by charge recombination via tunneling, with a rate depending on the state of the SiNW-FET. The comparison to porphyrin sensitized Carbon Nanotube FETs allows to distinguish the environment- and molecule-dependent photoconversion process from the charge-to-current transducing effect of the semiconducting channel. The spectral dependence of the photoconductance agree with the UV-visible absorption spectrum of the isolated molecule
[1] C. Winkelmann et al, Nano Lett, vol. 7 , p. 1454 (2007).

Vincent Bouchiat
CNRS-Grenoble

Date submitted: 03 Dec 2007 Electronic form version 1.4