

Nanowire Sensors

"Discovering and exploiting the unique properties of nanowires for sensing applications"

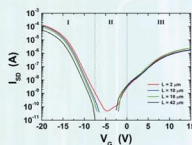
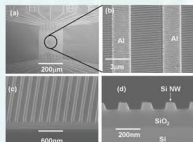
Sandia National Laboratories

8700 – François Léonard, Alec Talin, Paul Dentinger, Blake Simmons, David Robinson, Frank Jones
1800 – Nelson Bell, Tim Boyle, Bernadette Hernandez, Robin Sewell

LORD
LABORATORY DIRECTED RESEARCH & DEVELOPMENT

Physical & Engineering Sciences

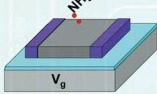
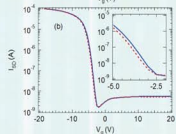
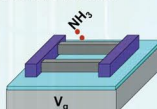
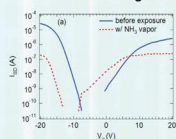
SILICON NANOWIRE ARRAYS



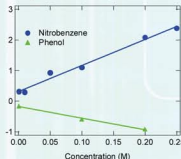
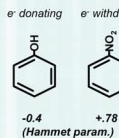
Large area, dense array of nanowires

Transistor action

Sensing more sensitive than thin film:

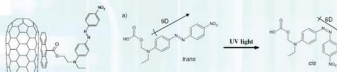
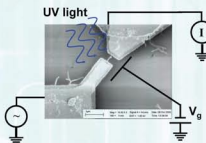


Sensing depends on analyte Hammett parameter

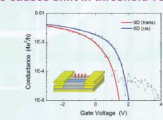
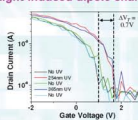


OPTICAL SENSING USING NANOTUBE/CHROMOPHORE HYBRIDS

(with M. Eriksson, P. Gopalan, Univ. of Wisconsin)



Light-induced dipole change causes shift in threshold voltage:



Modeling supports mechanism

Switching is repeatable for hundreds of cycles:

