

Abstract Submitted
for the APR05 Meeting of
The American Physical Society

Molecular Devices: A Potential Replacement for Semiconductors

ANTHONY MOELLER, University of Iowa, JOHN SUEHLE, OLEG KIRILLOV, LAUREN COHEN, ERIC VOGEL, CHRISTINA HACKER, CURT RICHTER, NIST — A test structure was developed to sandwich a monolayer of organic molecules (F-OPE and ODT) between two electrical contacts; Au and PDOT, a conducting polymer. It has been theorized that these molecules exhibit a switching behavior when a voltage is applied, which combined with the size of these molecules ($\sim 20 \times 10 \text{ \AA}$), should allow the construction of devices much smaller than current semiconductor devices. Four test structures were developed, an unetched one to test the insulating layer, one to test PDOT as an electrical contact, and the remaining two to test the F-OPE and ODT. The current was measured through each of the different devices for 0 to 1 V. The unetched sample showed currents on the order of pA, the sample with no molecules had currents on the order of mA, and the sample containing the F-OPE showed currents similar to that with no molecules, suggesting F-OPE self-assembly problems. The current for the sample containing ODT was between that for the unetched sample and that with no molecules, although a wide range of current was seen (~ 6 -7 orders of magnitude).

Anthony Moeller
University of Iowa

Date submitted: 14 Jan 2005

Electronic form version 1.4