Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Detection of DNA and Protein using CVD Graphene-channel FET Biosensors ABHILASH SEBASTIAN, ANIKET KAKATKAR, ROBERTO DE ALBA, HAROLD CRAIGHEAD, JEEVAK PARPIA, Centre for Materials Research, Cornell University — Graphene channel field-effect biosensors are demonstrated for detecting the binding of double-stranded DNA and poly-l-lysine. Sensors consist of CVD graphene transferred using a clean, etchant-free transfer method. The presence of DNA and poly-l-lysine are detected by the change in the Dirac Voltage (the voltage at which the graphene's resistance peaks) of the graphene transistor. Sensors show large shifts in the Dirac voltage $\sim$ 17 V after exposure to $\sim$ 580 pM of poly-l-lysine and $\sim$ 14 V upon exposure to 300 pM of DNA. The polarity of the response changes to positive direction with poly-l-lysine and negative direction with DNA. Sensors show detection limits of 8 pM for 48.5 kbp DNA and 11 pM for poly-l-lysine. The biosensors are easy to fabricate, reusable and are promising as sensors of a wide variety of charged biomolecules.

Abhilash Sebastian
Centre for Materials Research, Cornell University

Date submitted: 13 Nov 2014 Electronic form version 1.4