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Scanning Kelvin Probe Study of Electric Field Effect Tuning of Graphene Work function[1] YOUNG-JUN YU, YUE ZHAO, Columbia University, KWANG S. KIM, Pohang University of Science and Technology, PHILIP KIM, Columbia University, COLUMBIA UNIVERSITY TEAM, POHANG UNIVERSITY OF SCIENCE AND TECHNOLOGY COLLABORATION — We present the experimental work on the wok function variation of mono and bi-layer graphene device measured by scanning Kelvin probe microscopy (SKPM). Using the electric field effect (EFE), the work function of graphene can be adjusted as the gate voltage tunes the Fermi level across the charge neutrality point. Mono and bi-layer graphene samples are deposited on a silicon oxide covered silicon substrate by a mechanical exfoliation method and electrical contacts are fabricated by electron beam lithography. The underlying silicon substrate is used as a back gate to tune the carrier concentration of the graphene. After subtracting off the large back ground signal originating from the electrostatic environment, we obtain the work function of graphene samples modulated by the gate voltage. The change of work function can be ascribed by the Fermi level shift due to the EFE induced carrier doping and well quantified by the electronic band structure of mono and bi-layer graphene.

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Young-Jun Yu
Columbia University

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