Abstract Submitted
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Comparison between stamping method and one-by-one dry-transfer method for the fabrication of h-BN sandwiched graphene FET in the quantum Hall regime JEONGMIN PARK, HAEYONG KANG, JOONGGYU KIM, JEONG-GYUN KIM, YOOJOO YUN, NAHEE PARK, KIEU TRUONG, YOURACK LEE, DONGSUB CHUNG, DONGGYN KIM, CINAP, IBS, DOES, SKKU, HOYEOL YUN, SANGWOOK LEE, Konkuk University, YOUNG HEE LEE, DONGSEOK SUH, CINAP, IBS, DOES, SKKU — We have fabricated a dual-gate graphene field-effect-transistor (FET) for the study of integer Quantum Hall Effect in terms of its edge-state transport. The graphene was encapsulated by hexagonal boron-nitride (h-BN) flakes without any interlayer residues using the 'stamping-transfer' method, which is critical for the observation of graphene's intrinsic transport properties. Using the poly propylene carbonate (PPC) and Polydimethylsiloxane (PDMS), initially top h-BN flake is picked up and then graphene flake is picked up by van der Waals' force between graphene and top h-BN. These two layers are dropped down on the bottom h-BN flake to complete the encapsulated formation. To make the source/drain (S/D) and top-gate electrodes, whole area of graphene is not covered by top h-BN flake. The open areas of graphene, located at both ends, are covered by S/D metal electrodes, which made whole graphene channel region sandwiched by top and bottom hBN. We compared this method with the old one which put the two-dimensional flakes one by one using 'dry-transfer" method, and found out a significant difference in the device quality especially at low temperatures and high magnetic fields in the quantum Hall regime.

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