Introduction

- In this outline, a novel class of two-dimensional (2D) assembly namely thickness controlled homo-junctions with a configuration similar to graphene–insulator–graphene is introduced in this work.

- We demonstrate 2D–2D quantum tunneling between two graphene stacks in which van der Waals gap serves the purpose of tunneling barrier.

- The nonlinear I–V characteristics with improved current switching ratio (I_on/I_off) of ~10^6 coupled with counterclockwise current hysteresis which are the signatures of a memristive devices has been validated in the tunneling regime.

- It is the first time to report on revealing thickness modulated 2D homo junctions in exfoliated graphenic material and to disclose the involved tunneling mechanism for switching applications.

- This work promises well for the possibilities of graphene sheets for the realization of two terminal configured devices as a substitute of three terminal graphene based field effect transistors in the area of resistive switching memories.

Tunneling junctions from SEM and TEM studies

I–V Characteristics

- The I–V characteristics show a clear transition between the ON and OFF states, indicating the presence of tunneling.

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References