

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Tuning the Band Gap of Bilayer Graphene by Sandwich-Like Stacking¹ ZHENPENG HU, Nankai University — As far as we know, graphene has been taken as a potential host material for next-generation electric devices. However, this attractive prospect has been blocked by the metallic character of graphene. Although many methods have been proposed to get a moderate energy gap, such as hydrogenated graphene (graphane), but all the intrinsic advantages (carrier's mobility, etc...) of graphene have been destroyed. Here, we report that a large energy gap of graphene bilayer can be opened without breaking its natural characters by sandwiching it between functionalized BN substrates. Also, we show that the band gap of graphene bilayer can be tuned from 0.35 eV to 0.50 eV, depending on the substrates. The gap value is much larger than any other methods, and the structure of graphene bilayer is perfectly kept. And the energy gap is robust, namely, once the sandwiched substrates are selected, the relative position of substrates and graphene bilayer hardly changes the energy gap. Since the proposed way is easy to be realized in experiments, our results will hopefully accelerate the application of graphene in semiconductor devices and promote the development of the graphene technology.

¹This work is supported by NSFC 21203099

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Date submitted: 22 Oct 2015

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