

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Enhanced spin orbit interaction of graphene by Ir cluster decoration FENGQI SONG, YUYUAN QIN, ZHAOGUO LI, SIQI WANG, BAIGENG WANG, Nanjing University, COLLABORATIVE INNOVATION CENTER OF ADVANCED MICROSTRUCTURES TEAM — Enhancing the strength of the intrinsic spin orbit (SO) coupling in graphene is a critical issue in achieving the quantum spin Hall effect predicted by Haldane et al. Here we report the measurements of the weak localizations in graphene, which has been decorated by Ir clusters. The SO scattering rate (τ_{EM}) is extracted by fitting the curves using the formula of E. MacCan. It is found that τ_{EM} is monotonically dependent on the electronic relaxation time. Further analysis points that it obeys an Elliot-Yafet relaxation, which can be attributed to the dominance of Kane-Mele τ_{EM} interaction. The SO interaction strength can be extracted by fitting the τ_{EM} data dependent on the gate voltage. After considering the temperature effect, an SO strength value of 5 ~ 7meV is achieved, which has been greatly enhanced as compared to that of pristine graphene.

Fengqi Song
Nanjing University

Date submitted: 09 Nov 2014

Electronic form version 1.4