Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Orientation control of graphene flakes by magnetic field: broad device applications of macroscopically aligned graphene. FENG LIN, University of Electronic Science and Technology of China, China, ZHUAN ZHU, University of Houston, USA, XUFENG ZHOU, Chinese Academy of Sciences, China, WENLAN QIU, University of Houston, USA, CHAO NIU, JONATHAN HU, Baylor University, USA, KESHAB DAHA, University of Houston, USA, YANAN WANG, ZHENHUAN ZHAO, University of Electronic Science and Technology of China, China, ZHIFENG REN, DIMITRI LITVINOV, University of Houston, USA, ZHAOPING LIU, Chinese Academy of Sciences, China, ZHIMING M. WANG, University of Electronic Science and Technology of China, China, JIMING BAO, University of Houston, USA — We demonstrate the orientation control of graphene flakes by a weak magnetic field and subsequently show two examples of novel device applications of macroscopically aligned graphene. The control is made possible by a large diamagnetic susceptibility of exfoliated graphene. A liquid suspension of graphene flakes is first used for magnetic field sensing and display with sensitivity and spatial resolution higher than traditional iron filings or particles. The graphene suspension is then packaged as a writing and/or display board that can be controlled by magnets or magnetic field. Both applications require no external lighting or polarizing optics because they utilize macroscopic alignment and anisotropic optical properties of graphene. The macroscopic control and alignment of graphene can not only transfer unique properties of graphene from microscopic to macroscopic scale, but also be used to align other nanomaterials..

Feng Lin
University of Electronic Science and Technology of China

Date submitted: 11 Nov 2016 Electronic form version 1.4