Graphene, the new nanocarbon

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Graphene is a fascinating new nanocarbon possessing, single-, bi- or few- (≤ ten) layers of carbon atoms forming six-membered rings. Different types of graphene have been investigated by X-ray diffraction, atomic force microscopy, transmission electron microscopy, scanning tunneling microscopy and Raman spectroscopy. The extraordinary electronic properties of single-and bi-layer graphenes are indeed most unique and unexpected. Other properties of graphene such as gas adsorption characteristics, magnetic and electrochemical properties and the effects of doping by electrons and holes are equally noteworthy. Interestingly, molecular charge-transfer also markedly affects the electronic structure and properties of graphene. Many aspects of graphene are yet to be explored including synthetic strategies which can yield sufficient quantities of graphene with the desired number of layers.