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Growth of non-concentric graphene ring on 6H-SiC (0001) surface

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Optical antennas are devices that efficiently convert the energy of free propagating radiation into localized energy and vice versa. Optical antennas can be applied for sensing, photodetection, light emission, spectroscopy and so on. In this report we have demonstrated the growth of off-center graphene ring by annealing Si-terminated 6H-SiC under inert gas pressure of 0.05 atm. The eccentricity of the graphene ring can increase the efficiency of optical antennas. In addition, this bottom-up fabrication method can keep ring edges intact unlike e-beam lithography. The edge structure of the ring is, moreover, armchair edge. We found that the width of the ring depends on annealing temperature and time.

Keywords: epitaxial graphene, graphene ring, antenna, Si-terminated 6H-SiC, Atomic force microscopy, scanning tunneling microscope, scanning electron microscope.

Introduction

Optical antennas are devices that efficiently convert the energy of free propagating radiation into localized energy and vice versa. The development of optical antennas is promising for improving the efficiency of sensing, photodetection, photovoltaic technique, light emission, spectroscopy and so on.[1] Graphene is a two dimensional carbon material which its carbon atoms are packed in a honeycomb crystal lattice. Graphene plasmons have