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Preparation of SiC/Ge/graphene heterostructure on 4H-SiC(0001)

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ABSTRACT: Due to the wide bandgap of SiC, SiC-based optoelectronic devices can not be operated by visible (VIS) and near-infrared (NIR) light sources. A promising way to solve this problem is to adopt a SiC/Ge/Graphene heterostructure. The Ge film can be used as VIS-NIR-absorbing layer. As a electrode, graphene also forms a Schottky junction with Ge on 4H-SiC. To form the SiC/Ge/graphene heterostructures, Ge film was prepared on 4H-SiC(0001) by chemical vapor deposition, and then graphene on Cu foil was wet transferred on Ge films. The Ge film on 4H-SiC(0001) has polycrystalline structure and consists of self-assembled submicron Ge islands. The monolayer graphene with a few cracks and wrinkles was transferred on the Ge rough surface. The SiC/Ge/graphene heterostructure with high light absorption in the 500-1200nm range was prepared on 4H-SiC successfully.

Keywords: SiC; Ge/graphene heterostructure; Raman; Microstructure; Chemical vapour deposition

1 Introduction

SiC semiconductor has attracted considerable attention because of its excellent

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