Fabrication of Monolayer Graphene and Its Application

Abstract:

Graphene has attracted great interest due to its special band structure, very high electronic conductivity, light weight and extraordinary mechanical strength which made it good candidate for advance electronics including sensor, memory and transparent electrode. However, synthesis of controlled, uniform, defect free single domain graphene is challenging for many practical applications. Chemical Vapor Deposition (CVD) is commonly accepted synthesis process for high quality and controlled growth graphene.

In the first part this presentation I will talk about the optimized CVD growth of monolayer graphene and its metal hybrid which I had studied during my bachelor project. The main idea was to sputter and anneal metal (Au, Ag) on the graphene flakes fabricated by CVD and study the hybrid structure using Raman and XRD. We obtained maximum 100 µm grain diameter of monolayer graphene. We also observed low defect and doping effect in presence of Au and Ag nanoparticle.

In the second part of this presentation I will talk about an application of graphene for Nano-pore DNA reading sensor. The goal of this project was to exfoliate graphene (Gr) on SiO_2/Si substrate, make a nanometer size (<10nm) through hole in Gr/SiO_2/Si stack to sense the protein sequence in the DNA chain.