T1-003

Controlling the Growth of Few-layer Graphene Dependent on Composition Ratio of Cu/Ni Homogeneous Solid Solution

Yeongjin Lim, Hyonkwang Choi, Jaeseok Gong, Yunjae Park, Minhyon Jeon*

Department of Nano systems engineering, Center for Nano manufacturing,
Inje University, Gimhae, Gyungnam, 621-749, Republic of Korea

Graphene, a two dimensional plane structure of sp^2 bonding, has been promised for a new material in many scientific fields such as physics, chemistry, and so on due to the unique properties. Chemical vapor deposition (CVD) method using transitional metals as a catalyst can synthesize large scale graphene with high quality and transfer on other substrates. However, it is difficult to control the number of graphene layers. Therefore, it is important to manipulate the number of graphene layers. In this work, homogeneous solid solution of Cu and Ni was used to control the number of graphene layers. Each films with different thickness ratio of Cu and Ni were deposited on SiO_2/Si substrate. After annealing, it was confirmed that the thickness ratio accords with the composition ratio by X-ray diffraction (XRD). The synthesized graphene from CVD was analyzed via raman spectroscopy, UV-vis spectroscopy, and 4-point probe to evaluate the properties. Therefore, the number of graphene layers at the same growth condition was controlled, and the correlation between mole fraction of Ni and the number of graphene layers was investigated.

Keywords: few-layer graphene, Cu/Ni alloys, composition ratio

T1-004

Fabrication of IGZO-based Oxide TFTs by Electron-assisted Sputtering Process

윤영준[1], 조성환[1], 김창열[1], 남상훈[2], 이학민[2], 오종석[2], 김용환[2]

[1]한국세라믹기술원, [2](주)인포비온

Sputtering process has been widely used in Si-based semiconductor industry and it is also an ideal method to deposit transparent oxide materials for thin-film transistors (TFTs). The oxide films grown at low temperature by conventional RF sputtering process are typically amorphous state with low density including a large number of defects such as dangling bonds and oxygen vacancies. Those play a crucial role in the electron conduction in transparent electrode, while those are the origin of instability of semiconducting channel in oxide TFTs due to electron trapping. Therefore, post treatments such as high temperature annealing process have been commonly progressed to obtain high reliability and good stability. In this work, the scheme of electron-assisted RF sputtering process for high quality transparent oxide films was suggested. Through the additional electron supply into the plasma during sputtering process, the working pressure could be kept below 5×10-4 Torr. Therefore, both the mean free path and the mobility of sputtered atoms were increased and the well ordered and the highly dense microstructure could be obtained compared to those of conventional sputtering condition. In this work, the physical properties of transparent oxide films such as conducting indium tin oxide and semiconducting indium gallium zinc oxide films grown by electron-assisted sputtering process will be discussed in detail. Those films showed the high conductivity and the high mobility without additional post annealing process. In addition, oxide TFT characteristics based on IGZO channel and ITO electrode will be shown.

Keywords: IGZO, ITO, sputtering, oxide, TFT, electron beam