Photoconductivity induced by red light in a MoS_2/ferroelectric/semiconductor heterostructure

Sohwi Kim
Chansoo Yoon, Mi Jung Lee, Jihoon Jeon, Bae Ho Park*

Department of Physics, Konkuk University, Seoul 05029, Korea

a01062428461@gmail.com

Abstract

A photoconductivity at the interface of nano-junction between epitaxial ultrathin ferroelectric and semiconductor can be applied to optical devices. However, high performance has not been reported in such a system using red light. Here, we fabricated a ferroelectric/semiconductor heterostructure on a single crystal substrate $SrTiO_3$ by pulse laser deposition (PLD) system. And then, MoS_2 was transferred on nano-junction heterostructure using wet transfer method.
This system showed a large change in conductivity by 10^6 when illuminated red light is turned off. The photoconductivity significantly depended on the pulse duration of light illumination. In order to study the effect of band modulation on photoconductivity, we will further control polarization state of the ferroelectric thin film. Our MoS_2/ferroelectric/semiconductor heterostructure can pave the way to developing highly efficient optical device.

Figures

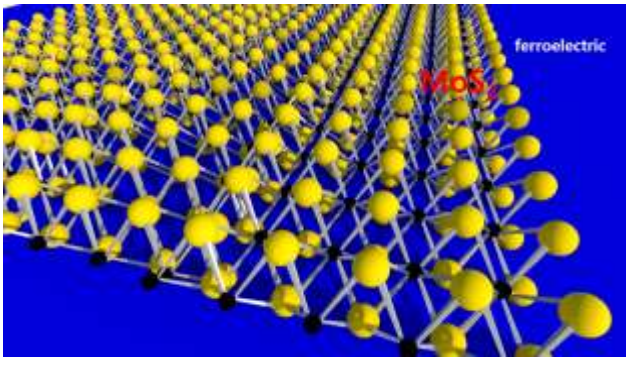

Figure 1: schematic of MoS_2/ferroelectric