Contribution ID: **266** Type: **Poster**

Synthesis of 2D MoS2 for flexible gas sensor at low temperature

Wednesday 20 June 2018 18:00 (20 minutes)

The effective synthesis two-dimensional molybdenum disulfides (2D MoS2) at low temperature is essential for their use in flexible devices. In this work, 2D MoS2 was grown directly at a low-temperature of 200 ℃ on both hard substrates (SiO2) and soft substrates (PI) using chemical vapor deposition (CVD) with Mo(CO)6 and H2S. We investigated the effect of the growth temperature and Mo concentration on layered growth by Raman spectroscopy and microscopy. The optical microscopy, Raman spectroscopy, X-ray photoemission spectroscopy, photoluminescence, and transmission electron microscopy measurements indicate that the low temperature CVD MoS2 is layered structure with good uniformity, stoichiometry and controlled layer number. Furthermore, we demonstrated the realization of 2D MoS2 based flexible gas sensor on PI substrate without any transfer process, and the sensor shows competitive sensor performance and mechanical durability at room temperature.
This study develops a low-temperature method for the deposition of MoS2 on substrate with low plastic deformation temperatures and to characterize the gas sensing properties of the prepared materials. The utility of the prepared material for sensing NO2 and NH3 over a wide range of concentrations. The strategies presented herein will be useful in the future development of flexible sensors.

Author: KIM, Youngjun (School of Electrical and Electronic Engineering, Yonsei University)

Co-authors: ZHAO, Yuxi (School of ELectrical and Electronic Engineering, Yonsei University); SONG , Jeong--Gyu (School of Electrical and Electronic Engineering, Yonsei University); RYU, Gyeong Hee (School of Materials Science and Engineering, Ulsan National Institute of Science and Technology); KO, Kyung Yong (Schoolf of Electrical and Electronic Engineering, Yonsei University); WOO, Whang Je (School of Electrical and Electronic Engineering, Yonsei University); LEE, Zonghoon (School of Materials Science and Engineering, Ulsan National Institute of Science and Technology); PARK, Jusang (School of Electrical and Electronic Engineering, Yonsei University); Prof. KIM, Hyungjun (School of Electrical and Electronic Engineering, Yonsei University)

Presenter: KIM, Youngjun (School of Electrical and Electronic Engineering, Yonsei University)

Session Classification: Poster Session Wednesday

Track Classification: Electronic Materials & Processing