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Transition metal dichalcogenide based electrospun fibers formation as a potential for gas sensorDoo-Hyeb Youn¹, Bong-Jun Kim², Hongkyw Choi¹, Changbong Yeon^{1,3} and Sun Jin Yun^{1,3}¹Electronics and Telecommunications Research Institute, Republic of Korea²Mobrik Co. Ltd., Republic of Korea³University of Science and Technology, Republic of Korea

With the rapid development of industry, the hazardous gases have become a serious problem which is harmful to human health and safety. NO₂, as one kind of toxic gases, can cause photo chemical smog and acid rain. In addition, it could affect human health even at Part Per Million (ppm) levels, such as respiratory system and nerve system. Thus, there is a strong demand for developing cheap, reliable and sensitive gas sensors targeting NO₂. Recently, gas sensors with hybrid of one dimensional fibers and nanostructure such as a wire, tube, and fiber have attracted much attention owing to their high sensitivity, low cost and high response. In these studies, we fabricate the electro spun MoS₂ and WS₂ fibers with hierarchical flower-like structures. We applied WS₂ fibers in gas sensors using their high surface-to-volume ratio and unusual electrical properties. There is no report on the fabrication of sensors of MoS₂ and WS₂ fibers consisting of WS₂ fiber and high crystalline nanostructures (sheets) attract more interest due to their less gas diffusion length and higher mobility. In addition to the one dimensional fiber structure, we designed and fabricated high surface-to-volume ratio 3D hierarchical flower-like structures for increasing the gas-sensitivity. Effects of annealing temperature under sulfur flow on the morphological changes of MoS₂ and WS₂ fibers are reported and will be discussed.

Biography

Doo-Hyeb Youn has received his BS and MS degrees in Solid-State Physics from Pusan National University, Republic of Korea . He has received his PhD in Materials Science from Tokushima National University, Japan in 1999. He has joined the Electronics and Telecommunications Research Institute, Daejeon, Republic of Korea , in 2001. His research interests include growth and process of III-V nitrides blue light-emitting diodes (AlGaIn, GaN) and HEMTs, analysis of III-V compound semiconductor devices. He is a Member of the Japan Society of Applied Physics.

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