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Influence of black phosphorus thin films deposited by inkjet printing process for optoelectronics**Ho Young Jun, Eon Ju Lee and Si Ok Ryu**
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Black Phosphorus (BP), the most stable allotrope of phosphorus, is a material stacking individual atomic layers together through Van der Waals interactions. The band gap of BP is tunable from 0.3 eV for bulk BP to 2.0 eV for phosphorene (monolayer BP) depending on the number of stacked layers. Two-dimensional black phosphorus (phosphorene) dispersed in a solution is obtained by the solvent exfoliation. Among various solvents, N-Methylpyrrolidone (NMP) is found to provide stable, highly concentrated BP dispersions. However, its instability under ambient conditions leads to material deposition options for device fabrication. Black phosphorous thin films were deposited on the substrates using inkjet printing method. Physical properties of the films were systematically characterized by Atomic Force Microscope (AFM), Scanning Electron Microscopy (SEM), Photoluminescence (PL), Transmission Electron Microscope (TEM) and Raman spectroscopy. In this study, the stable, highly concentrated, electronic-grade phosphorous thin films were successfully deposited by combining the solvent exfoliation with the inkjet printing deposition method. Considering our result obtained in this study, it is believed that the black phosphorene prepared in this study could be applied to large-area, high-performance phosphorene devices.

Biography

Ho Young Jun has completed his Master's degree from Yeungnam University and currently he is a PhD student at Yeungnam University School of Chemical Engineering. He is working on 2D materials, optoelectronics and solar cells. He has published more than three papers in reputed journals.

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