

Vapor-phase patterning of organic-inorganic hybrid perovskite thin films신내철[†]

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Organic-inorganic hybrid perovskites (OIHPs), such as methylammonium lead iodide ($\text{CH}_3\text{NH}_3\text{PbI}_3$) have shown outstanding optoelectronic properties, promising extensive application in solar harvesting. Although most hybrid perovskite materials have been synthesized under solution process, the utilization of these hybrid perovskites requires thin film fabrication associated with the patterning process to realize the device integration. Moreover, conventional top-down lithography using polar solvent is generally detrimental to the OIHP layers owing to their intrinsically low stability. This talk addresses our recent effort on the vapor-phase patterning of OIHP thin films. The process is based on the vapor-phase intercalation of methylammonium halide into the lead halide thin layers, which are pre-patterned via selective deposition on a photolithographically fabricated cross-linked copolymer template. Specifically, thin film patterns of $\text{CH}_3\text{NH}_3\text{PbI}_3$ are prepared by intercalation of the vapor-phase $\text{CH}_3\text{NH}_3\text{I}$ into the templated-grown PbI_2 layers. These results emphasize the applicability of CVD process to the production of OIHP patterns for various optoelectronic applications.