

Orientation-dependent hybrid perovskite conversion of VLS-grown lead halide nanowires

심혜원, 신내철[†]

인하대학교

(nshin@inha.ac.kr[†])

Organic-inorganic hybrid perovskites, such as methylammonium lead iodide ($\text{CH}_3\text{NH}_3\text{PbI}_3$) have demonstrated outstanding optoelectronic properties, promising extensive application in solar harvesting. To date, most hybrid perovskite materials are synthesized via solution processing, produced in thin films or particles. As opposed to this polycrystalline phase, however, 1D nanowire offers distinct properties such as longer carrier diffusion length with lower recombination rate. Here, we use the VLS method to prepare lead halide (i.e., PbI_2) nanowires using Sn as an assistant for the self-catalyzed growth and convert into hybrid perovskite. We observe resulting PbI_2 nanowires grow mainly in two different directions: $[0001]$ and $[1\bar{2}1\bar{0}]$, and confirm the conversion rate is related to the orientation. These results provide a pathway to the fundamental understating of vapor phase synthesis of perovskite materials.