

ST-P003

Growth and properties of LCMO/YBCO heterostructure

Manish Kumar and Hyun Hwi Lee

Pohang Accelerator Lab., POSTECH

Complex oxide heterointerfaces have been extensively explored in the past due to the novel phenomenon emerging at such interfaces that differ from their individual bulk counterparts. The integration of a ferromagnetic (FM) material with the superconducting (SC) material leading to proximity effect is one of the commonly studied phenomenon in these heterostructures. In continuation, we have stabilized the FM layer $\text{La}_{0.7}\text{Ca}_{0.3}\text{MnO}_3$ (LCMO) on SC material $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ (YBCO) using pulsed laser deposition technique and explored the structural, magnetic, electrical and magneto-transport properties of this heterostructure. Φ -scan measurements confirm the epitaxial nature of LCMO/YBCO heterostructure grown on single crystalline SrTiO_3 substrate. The FM transition of LCMO and SC transition of YBCO are observed in the magnetization measurements of the bilayer structure. Through electrical measurements, we understood that the proximity effect leads to lowering of the SC transition of YBCO. The role of interface in the bilayer structure is also realized through electrical transport measurements.

Keywords: proximity effect, LCMO, YBCO

ST-P004

Improved performance of n-type organic field-effect transistor with a non-conjugated polyelectrolyte layer

Yu Jung Park¹, Myoung Joo Cha¹, Jin Hee Lee¹, Shinuk Cho²,
Jung Hwa Seo^{1*}, and Bright Walker^{3,*}

¹Department of Materials Physics, Dong-A University, Busan, 604-714, Republic of Korea, ²Department of Physics and EHSRC, University of Ulsan, Ulsan 680-749, Republic of Korea, ³School of Energy and Chemical Engineering, Ulsan National Institute of Science and Technology, Ulsan, 689-798, Republic of Korea

We characterized the n-type organic field-effect transistors (OFETs) with non-conjugated polyelectrolytes (NPEs) interlayers as the electron injection layer. Novel NPEs with various ions (Cl⁻, Br⁻, I⁻) improved the electron mobility from 5.06×10^{-3} to $2.10 \times 10^{-2} \text{ cm}^2\text{V}^{-1}\text{s}^{-1}$ in OFETs based [6,6]-Phenyl-C₆₁-butyric acid methyl ester (PCBM) when PEIEH⁺I⁻ spin-cast from 0.6% solution was deposited onto the PCBM layer. Reduced electron injection barrier (ϕ_e) at NPE/metal electrode interface was induced by dipole formation and led to increase the electron injection and transport. These findings are important for understanding how NPEs function in devices, the improvement of device performance, and the design of new materials for use in optoelectronic devices.

Keywords: Organic field effect transistor (OFET), n-type, Non-conjugated polyelectrolyte (NPE), Electron injection layer (ETL), [6,6]-Phenyl-C₆₁-butyric acid methyl ester (PCBM)