

Fabrication of high quality Ag thin film using ZnO buffer layer

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Silver (Ag) is a metal with the highest conductivity. It is the only metal with lower resistance ($1.63 \mu\Omega \text{ cm}$) than copper ($1.72 \mu\Omega \text{ cm}$). However, when it is used as a thin film, the scattering of electrons at the grain boundary is combined with the effect of surface scattering, so that the decrease of conductivity and the oxidation problem become more serious and the signal of reflectance and plasmonic phenomenon in the visible light region is lost. In this study, we tried to compensate many disadvantages of silver thin film by growing the silver thin film close to the single crystal level. A modified sputtering system was used instead of MBE or ALD to fabricate samples with a large area, and ZnO grown on Al_2O_3 substrate with orientation (001) was grown on the Ag thin film. The crystallinity of the fabricated samples was investigated using XRD, SEM, EBSD, AFM and sheet resistance. The fabricated silver thin films showed a high

level of (111) surface orientation and surface roughness of RMS $1 \sim 1.5 \text{ nm}$ and a sharp decrease in grain boundaries. In addition, by controlling the deposition time of the silver thin film, it is possible to manufacture a silver thin film having a thickness of several tens of nanometers to several hundreds of nanometers, so that it can be applied for various purposes.

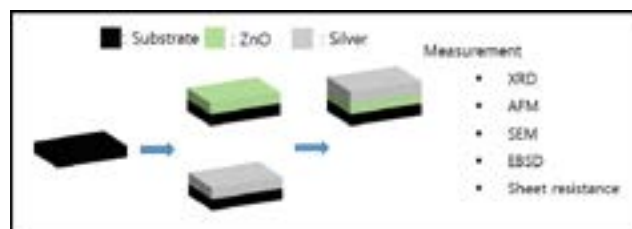


Figure: Experimental schematic diagram

Biography

Bo Gwang Jung graduated from Pusan National University in 2017 with a major in Optical Mechatronics. After that, I am a master student of the major in the Cogno-Mechatronics as a student of Professor Se – young Jeong in Pusan National University. My research area is on the physical properties and application of metal (copper and silver) thin films.

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