

# Fabrication and Characterization of nano wire grid polarizers film by magnetic soft mold

Doo-sun Choi<sup>1</sup>, Sunghwan Chang<sup>1</sup>, Sang-Uk Jo<sup>2</sup>, Myung Yung Jeong<sup>2</sup>

<sup>1</sup>Korea Korea Institute of Machinery and Materials (KIMM),  
156 Gajeongbuk-Ro Yuseong-Gu Daejeon 305-343, Republic of Korea  
<sup>2</sup>Department of Cogno-Mechatronics Engineering, Pusan National University,  
Geumjeong-gu Busan 609-735, Republic of Korea  
[schang@kimm.re.kr](mailto:schang@kimm.re.kr)

## Abstract

We propose the fabrication of a 70 nm half-pitch wire grid polarizer(Figs.1,2,4) with high performance using magnetic soft mold. The device is a form of aluminium gratings on a PET(Polyethylene phthalate) substrate whose size of 3cm × 3cm is compatible with a TFT\_LCD(Tin Flat Transistor Liquid Crystal Display) panel. A magnetic soft mold with a pitch of 70 nm was fabricated using two-step replication method(Fig.3). As a result, we get a NWGP(nano wire grid polarizer) pattern which has 70nm line width, 150nm depth, 140nm pitch, on substrate. The maximum and minimum transmittances of the NWGP at 800 nm were 80% and 10%(Fig.5), respectively. This work demonstrates is a unique cost-effective solution for nanopatterning requirements in consumer electronics components.

## References

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## Figures

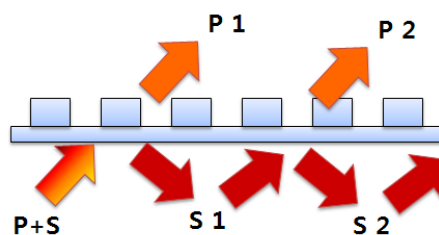


Fig 1. Schematic of polarization recycling principle using metal wire grid polarizer film.

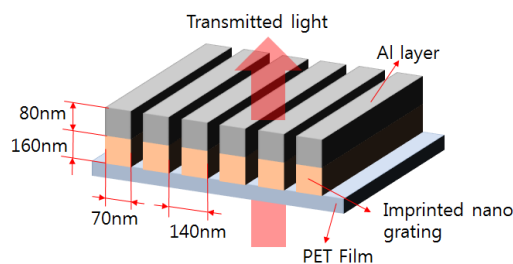


Fig 2. Design of metal wire grid polarizer film.

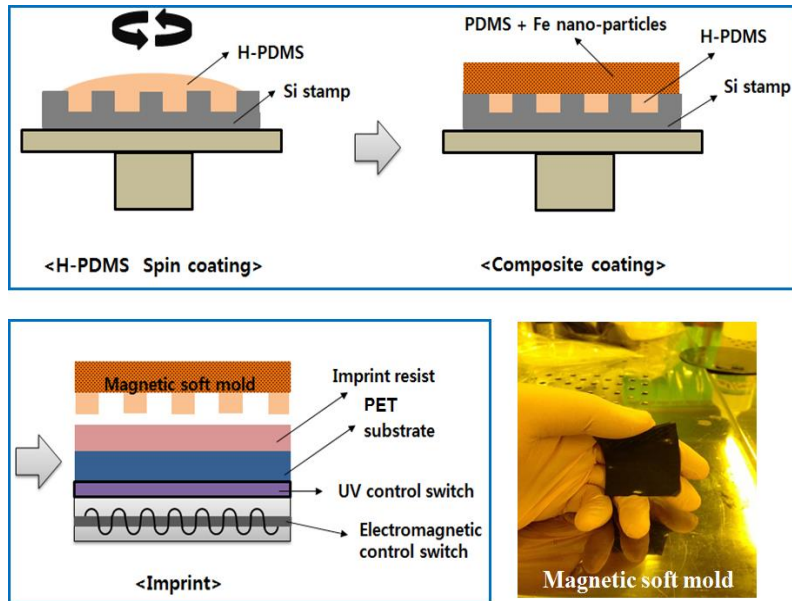


Fig 3. Schematic of magnetic soft mold fabrication process.

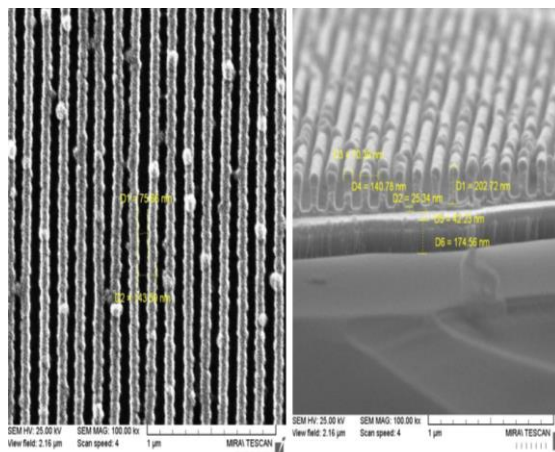


Fig 4. SEM image top view of (a) metal deposition NWGP structure and (b) cross sectional SEM image of metal deposition NWGP grating with a pitch 140 nm and grating height of 202 nm.

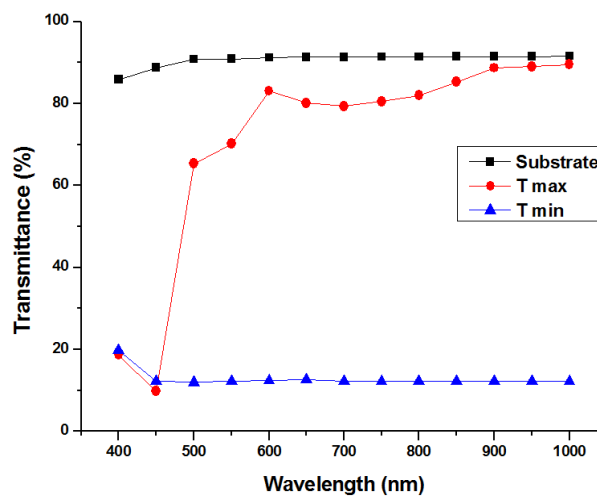


Fig 5. Transmittance curves of an Al NWGP on PET substrates