In a typical liquid crystal displays (LCDs), the light efficiency is below 10% due to the loss of light in the path from the light source to an LCD panel and the presence of absorptive polarizer.

Nowadays, a reflective polarizer is always used between the backlight units and LCD panels to circumvent this problem; however, the improvement is limited.

Since a nano-wire grid polarizer (NWGP) has been known as a reflective polarizer. The brightness enhancement is achieved through a polarization recycling, which is illustrated schematically in the figure.
LIGA Nano-Wire Grid Polarizer (NWGP)

- e-beam litho.
- X-ray nano-fabrication
- Au-plating X-ray Mask

- The minimum feature size is about 0.7 um and the height is 6 um (aspect ratio ~9).
- Preliminary measurement results show that the optical reflection intensities from the substrate are obviously lower with applying NWGP structure; the reflective intensities also decrease with increasing the NWGP height (i.e. Moth’s eye effect).

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**Reflection Spectrum of the NWGP**

**Remark:**
- Note: only 1/15 of the measurement area with NWGP nano structure
- NWGP can effectively absorb the light in the visible range.
- The absorbance of 8 um thick NWGP is slightly higher than the 6 um thick NWGP.

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