

Fine width metal mesh fabrication by the ion-beam assisted deposition (IBAD) for the touch screen panel (TSP)

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Touch screen panel (TSP) is being widely used, such as mobile devices, kiosks, monitors and TV. A conductive thin film for detecting a touch on the TSP, the ITO has been used mainly. However, Indium is buried in several mines in China and the United States. Accordingly, Korea is dependently importing all the amount of Indium from overseas. Many studies for the fabrication of the metal mesh including Cu or Ag have been carried out to address this problem. In particular, the fabrication method of the metal mesh with fine width is a major issue to prevent of moire phenomenon.

In this study, metal mesh with a width of 3.5 μm is fabricated by the ion-beam assisted deposition (IBAD) process [1]. When fabricating the metal mesh of the thin film deposited under a 10 μm with the conventional sputtering method, broken or rough lines are formed during the photo lithography process due to the leak adhesion between metal and surface. However, the IBAD process increase the adhesion between metal and substrate, it is due to the increase of the surface energy by ion. Fig. 1 shows a scanning electron microscope (SEM) image of the metal mesh after IBAD process. The width of the line is about 3.5 μm , and the line is formed uniformly in the area of 10 cm^2 . Table. 1. Shows the sheet resistance and transmittance by open ratio in the width of 3.5 μm . As a result, the transmittance is 91 % and the sheet resistance is 23.1 Ω under a 400 μm open ratio.

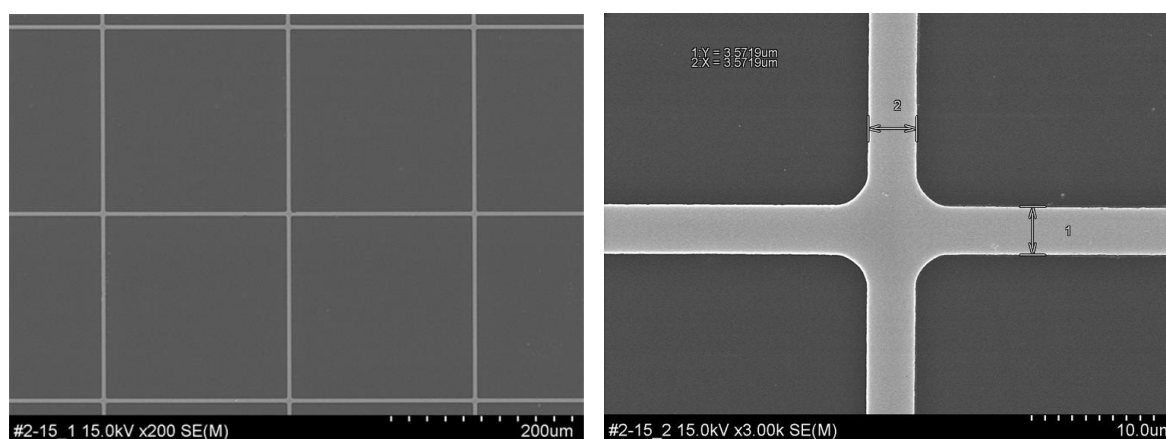


Fig. 1. SEM image of the metal mesh after IBAD process

Table. 1. Sheet resistance and transmittance by open ratio in the width of 3.5 μm

	Open ratio [μm]	Sheet resistance [$\Omega/\text{sq.}$]	Transmittance [%]
Width 3.5 μm	100	5.03	84.5
	200	11.31	88.9
	300	14.61	90.2
	400	23.1	91.1

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References

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