

Fabrication of Metal Nanowires by Direct Metal Transfer Technique

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Organic electronic devices have been widely investigated in many groups because of its application to the flexible and portable devices. To define top electrodes, conventional optical lithography and subsequent lift-off process is normally used. However, the lift-off solvent could penetrate and degrade the organic active layer during the process, resulting in weird device behaviors and failure in device fabrications accordingly.

Therefore, alternative ways with non-aqueous process have been performed such as microcontact printing, cold welding and metal transfer printing. Those processes have the similar process scheme in that firstly, the metal film is deposited on top of the previously patterned stamp and then pressed on the active organic layer while applying a certain pressure. The top electrodes are defined after transferring the metal film of the protruded area in the stamp to the active layer surface either physically or chemically.

As described, the process is simple and performed in non-aqueous atmosphere with low cost. Successful organic electronic devices fabricated by the contact printing method have been reported at micro scale.

In this study, we used a silicon stamp which was appropriate for the metal transfer at nano-scale. Metal nanowires at 70nm half-pitch were transferred uniformly on top of a polymer film which served as a memory active layer.