

Supporting Information:

**Multi-Layer Transfer and Lamination (MTL) Process Using
High Pressure Air-jet for Highly Efficient and Solution-
Processed Polymer Light Emitting Diodes**

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All processing steps for the MTL processed device are shown in Figure S1. Mainly the fabrication process can be divided to two parts namely anode part side and cathode part side. For the cathode side part, PA film was laminated on PET substrate by using soft roller on the hotplate followed by spin coating of super yellow on the OTS treated glass. Afterwards ZnO NP layer and ionic solution was sequentially spun on to super yellow layer. As the last layer on cathode side, Al was thermally evaporated on the ZnO+Ionic complex layer. For the preparation of anode part, ITO was cleaned using DI water, acetone and IPA sequentially. The cleaned glass was subjected to UV-ozone treatment and spin coating of PEDOT:PSS was performed. As a first step of MTL process, the PA/PET film was placed on Al cathode followed by thermally activated lamination with the soft roller on hot plate. Next, multi-layers from the cathode side was fast delaminated using air-jet from the SAMs coated glass and eventually device fabrication was completed by joining cathode part and anode part on the hot plate (50 °C) with the help of soft roller.

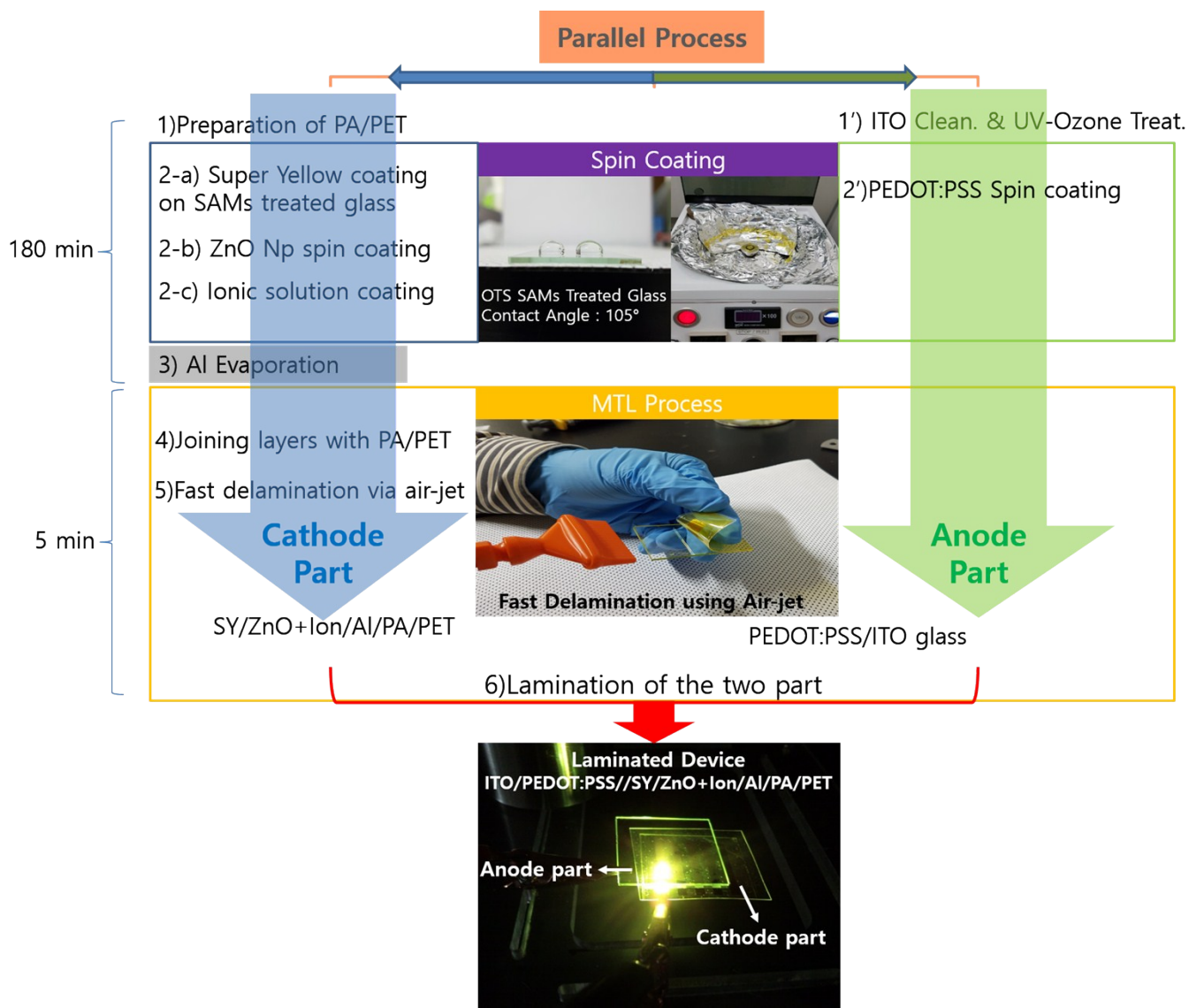


Figure. S1 Detailed fabrication process for the preparation of anode and cathode part independently followed by MTL process for device fabrication.

To investigate single metal layer's delamination characteristics, Ag 150nm was deposited on the SAMs treated glass substrate then the Ag layer was delaminated by using the Air-jet system. In case of fast delamination (0.4 Mpa) as shown in Figure S2 cracks and buckling issues significantly eliminated as opposed to the case of without air-jet lot of cracks and buckling issued are clearly visible.



Figure. S2 Single Ag film delamination characteristics by using the air jetting system.