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Fabrication of a stretchable transparent electrode with jagged grid structure using silver ink

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Abstract

A metal nanogrid pattern with high aspect ratio was successfully fabricated on a stretchable substrate using silver ink. The master mold was fabricated by electron-beam lithography and dry etching, whereas the replica mold was replicated from the master mold by ultraviolet nanoimprint lithography. The replica mold was coated with silver ink and covered with a polyester film, which was then pressed using a roller to fill the mold trenches with the silver ink. Next, the silver ink remaining in the bottom of the replica mold was sintered at 120 °C for 5 min. Finally, the sintered silver ink at the bottom of the replica mold was transferred onto a polyester film using an ultraviolet-curable resin. The resulting transparent electrode had a transmittance of 81% at a wavelength of 550 nm and resistance of 11.0 Ω . The strain on the electrode was 22.7% under a tensile load of 0.78 N.

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