

Supporting Information

Highly stretchable and waterproof electroluminescence device based on superstable stretchable transparent electrode

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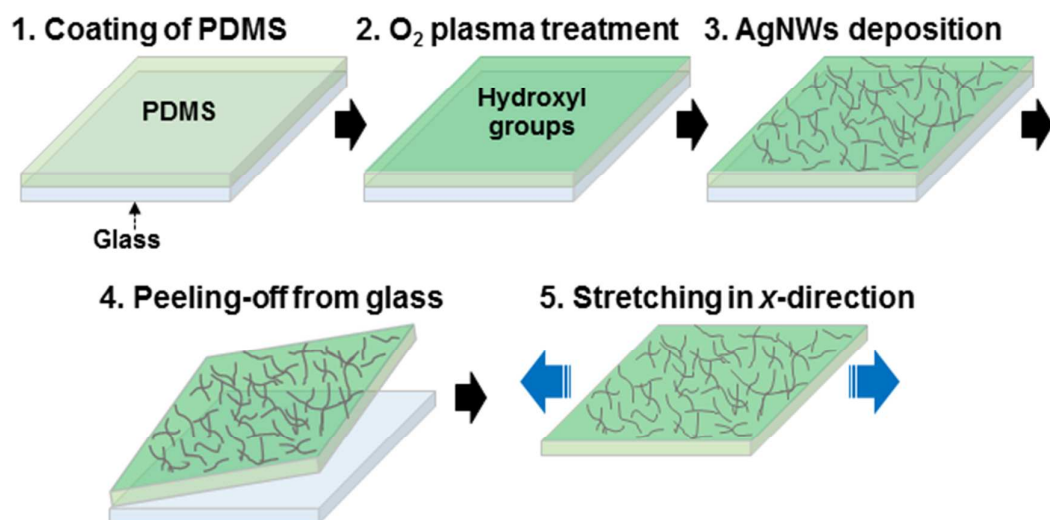


Figure S1. Schematic depiction of the fabrication steps of AgNWs/PDMS electrodes.

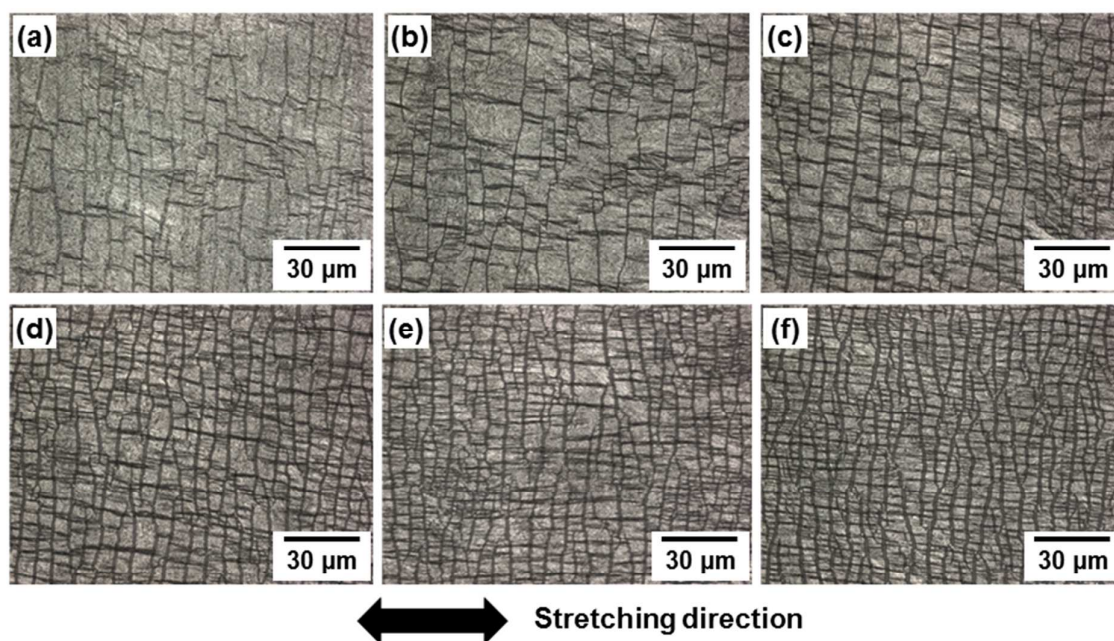


Figure S2. Micrographs of AgNWs on hydroxylated PDMS that are being stretched with (a) 5%, (b) 10%, (c) 25%, (d) 50%, (e) 75%, and (f) 100% strain.

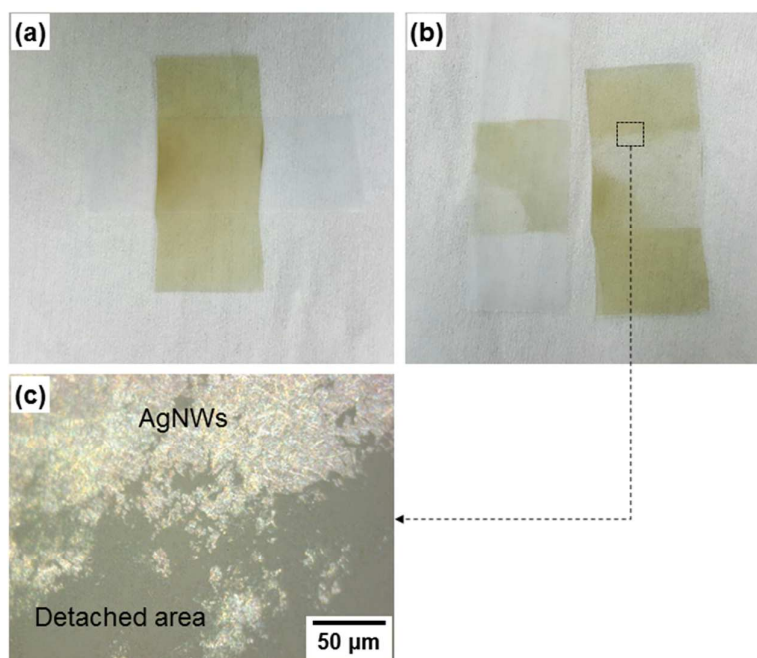


Figure S3. (a) Tape adhered to an AgNWs/PDMS (embedded) sample, (b) after detachment of the tape, and (c) enlarged view near the area where the tape was detached.

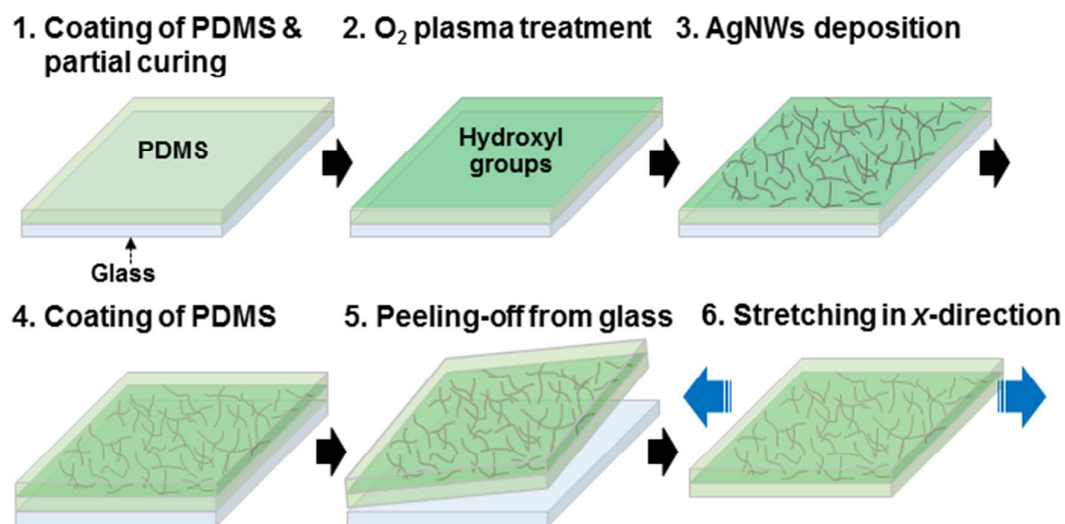


Figure S4. Schematic depiction of the fabrication steps of PDMS/AgNWs/PDMS electrodes.

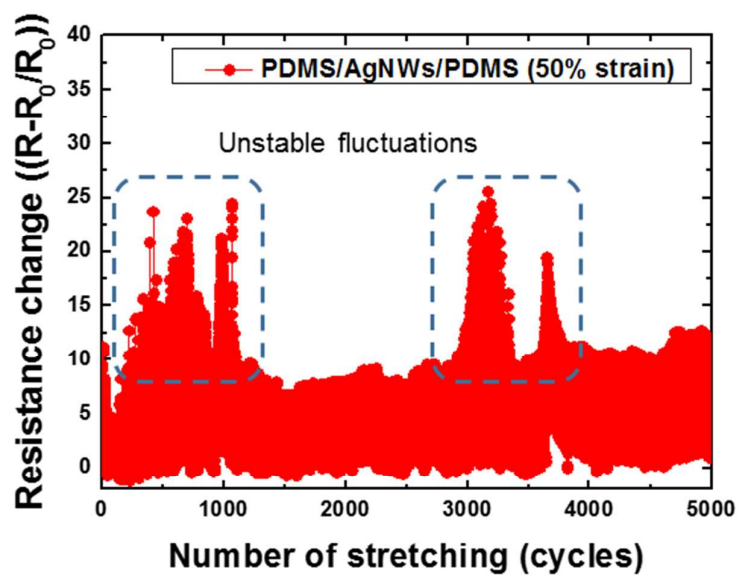


Figure S5. Resistance change of the PDMS/AgNWs/PDMS electrode under repeated stretch–release testing with 50% strain.

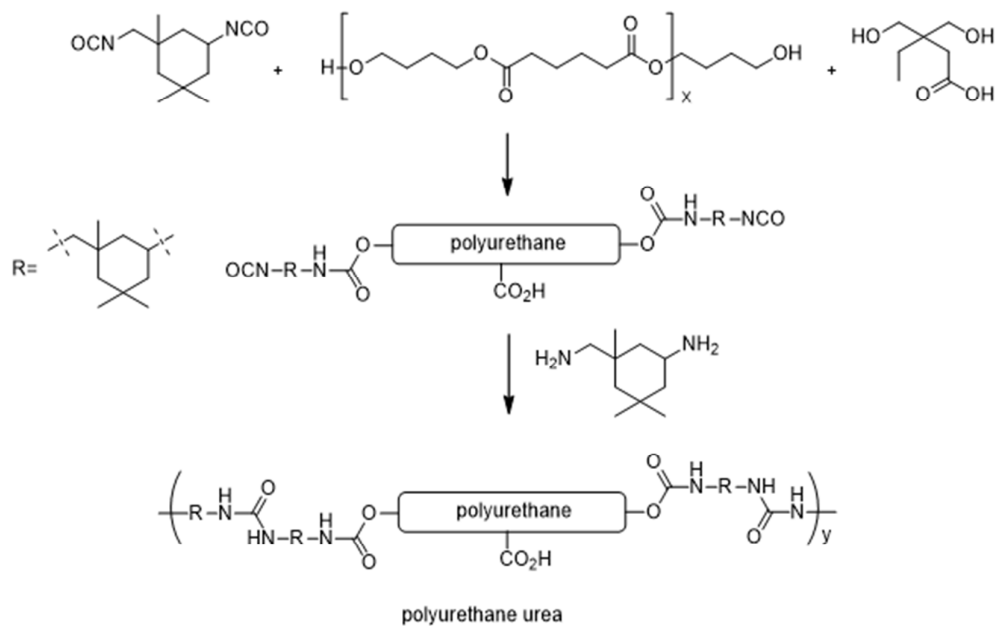


Figure S6. Synthesis of polyurethane urea (PUU).

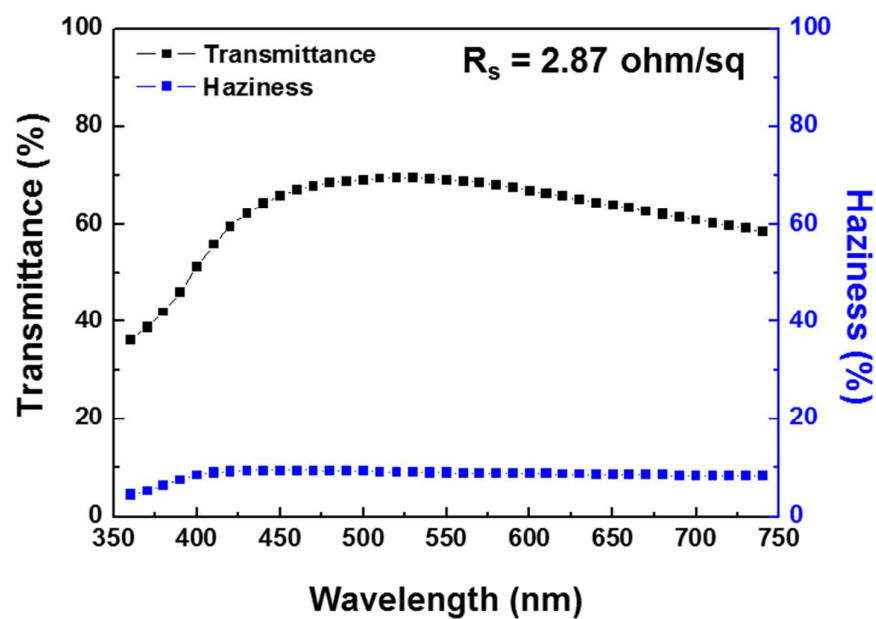


Figure S7. Optical characteristics of the PUU/AgNWs/PDMS electrodes. R_s of the electrode was designed to be around 2.9 ohm/sq.

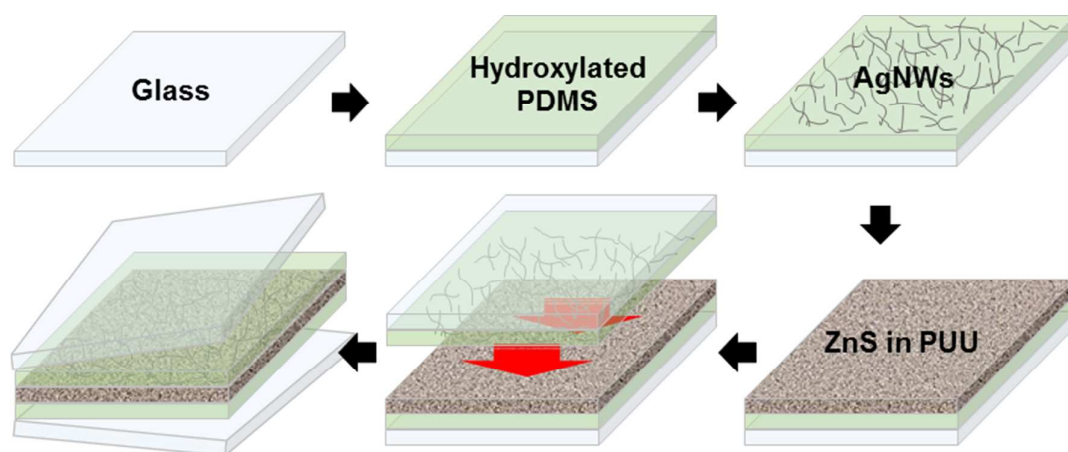


Figure S8. Schematic depiction of the fabrication of stretchable, waterproof EL devices.

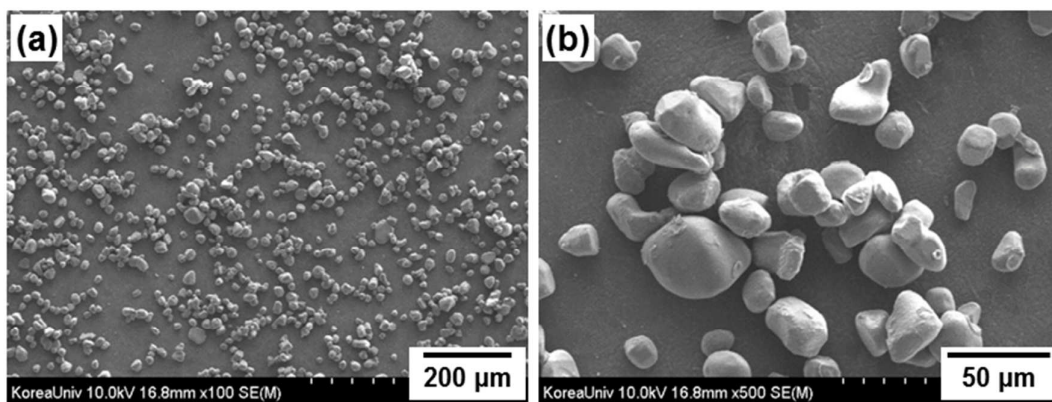


Figure S9. ZnS microparticles employed in this study: (a) low magnification and (b) high magnification.

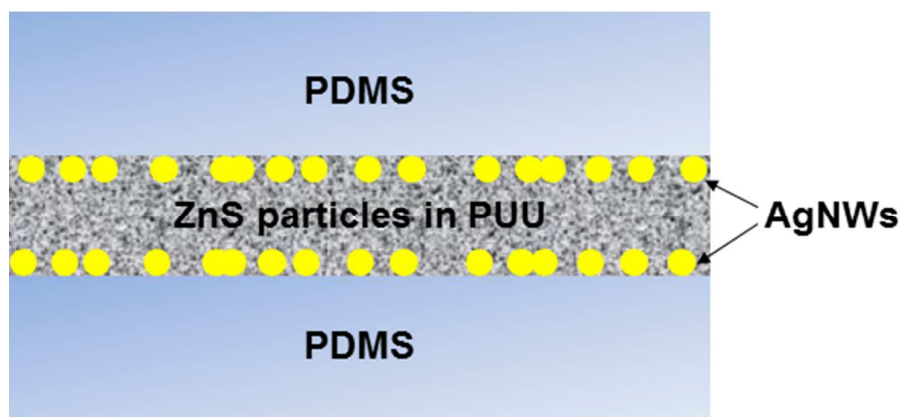


Figure S10. Schematic cross-sectional depiction of the stretchable and waterproof devices.

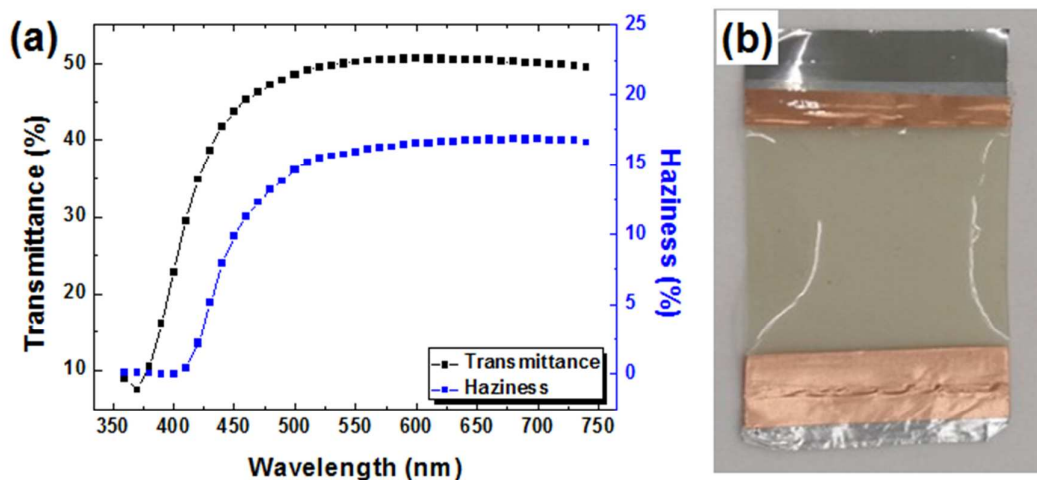


Figure S11. (a) Optical characteristics of a fabricated EL device and (b) a device sample placed on a white paper with aligned KETI emblems.



Figure S12. Sealing of the AgNW electrodes from exposure to water.

In order to seal the electrodes from an exposure to water, we first used a slice of aluminum tape to make connections between the connectors and the AgNW electrodes, then most part of the aluminum tape was sealed by a slice of black-colored insulation tape (see **Figure S12**). The waterlogging area was indicated by a blue dotted square in the Figure S12, implying that the aluminum or AgNWs electrodes were not exposed to water.

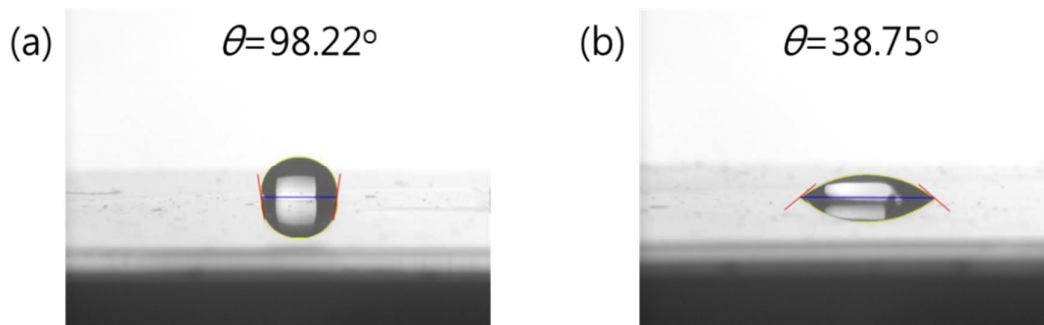


Figure S13. The water contact angle of the PDMS (a) before and (b) after the O₂ plasma treatment.

The O₂ plasma treatment on the PDMS film changed the water contact angle from 98.22° to 38.75° indicating that the surface became hydrophilic through the hydroxylation of it.

Movie S1. A demonstration of the fabricated stretchable and waterproof EL device.