Supporting Information

Shear-Assisted Laser Transfer of Metal Nanoparticle Ink to an Elastomer Substrate

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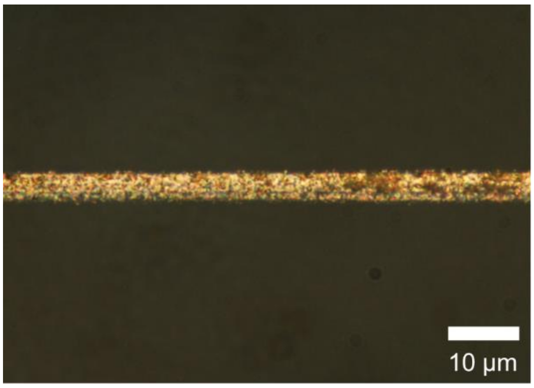
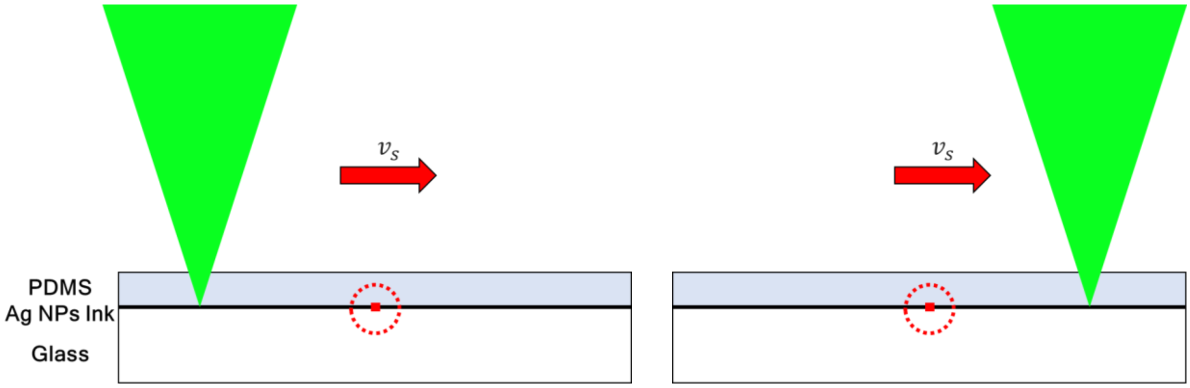


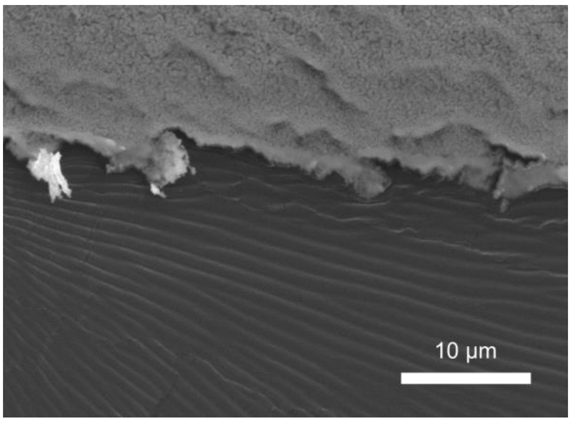
Supporting Figure S1. Reflection optical microscope image of the laser-transferred Ag electrode on the PDMS film by 50× objective lens, which reaches the feature size of <5 μm.



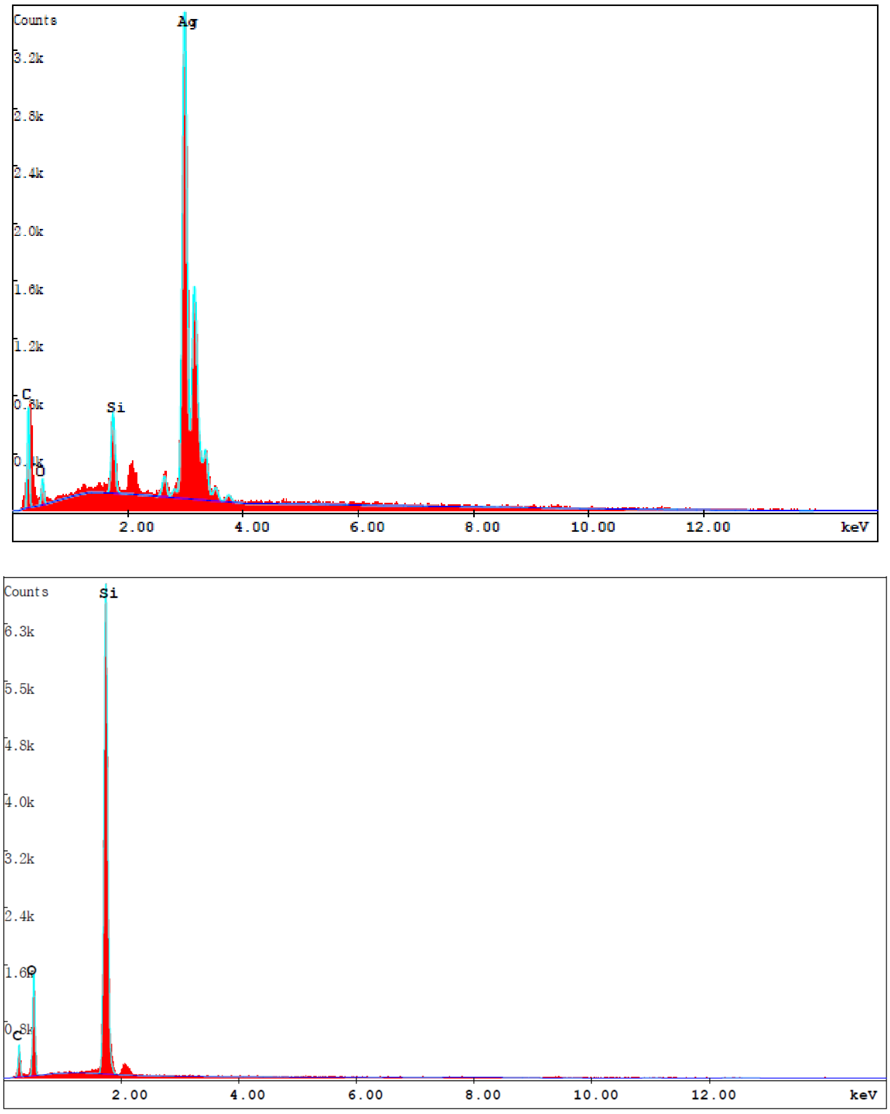
Supporting Figure S2. Schematics for the calculation of the temperature rise and its time derivative induced by CW-focused laser beam under scanning. The following equation has been adopted for the calculation.

$$\Delta T(0, t^*; v_s^*) = \frac{2}{\pi}\theta_c \int_0^\infty \frac{dt_1^*}{t_1^{*\frac{1}{2}}(1+4t_1^*)} \exp\left(-\frac{v_s^{*2}(t^*-t_1^*)^2}{1+4t_1^*}\right)$$

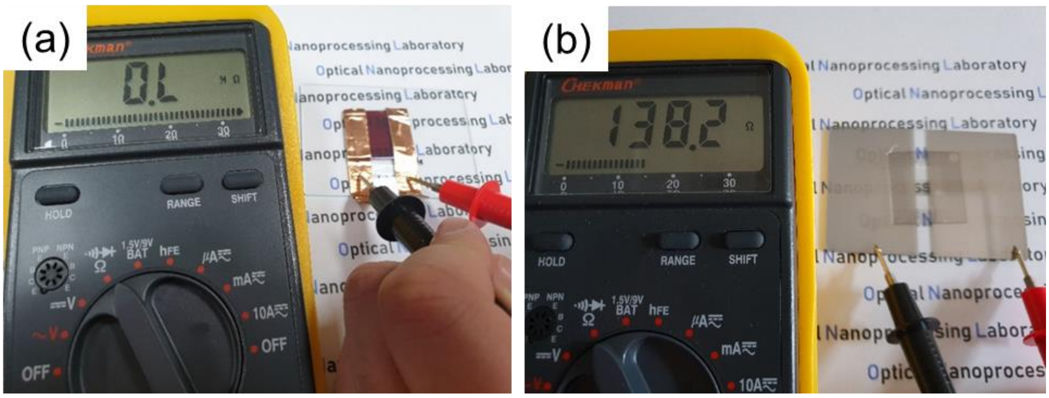
The equation above corresponds to the following conditions: zero surface conductance (η=0), infinite surface absorption ($\alpha^* = \infty$), characteristic length $l \equiv \omega_0 = 5\ \mu m$. The thermal effect from the upper PDMS film is also excluded. Linearized temperature θ_c is defined as $\theta_c \equiv \theta_c^G \approx 0.89 I_a \omega/\kappa$. The scanning procedure starts at t = $-\infty$ and passes the position x=0 at t=0. The dimensionless velocity is determined from $v_s^* \equiv v_s \omega_0 / D$.



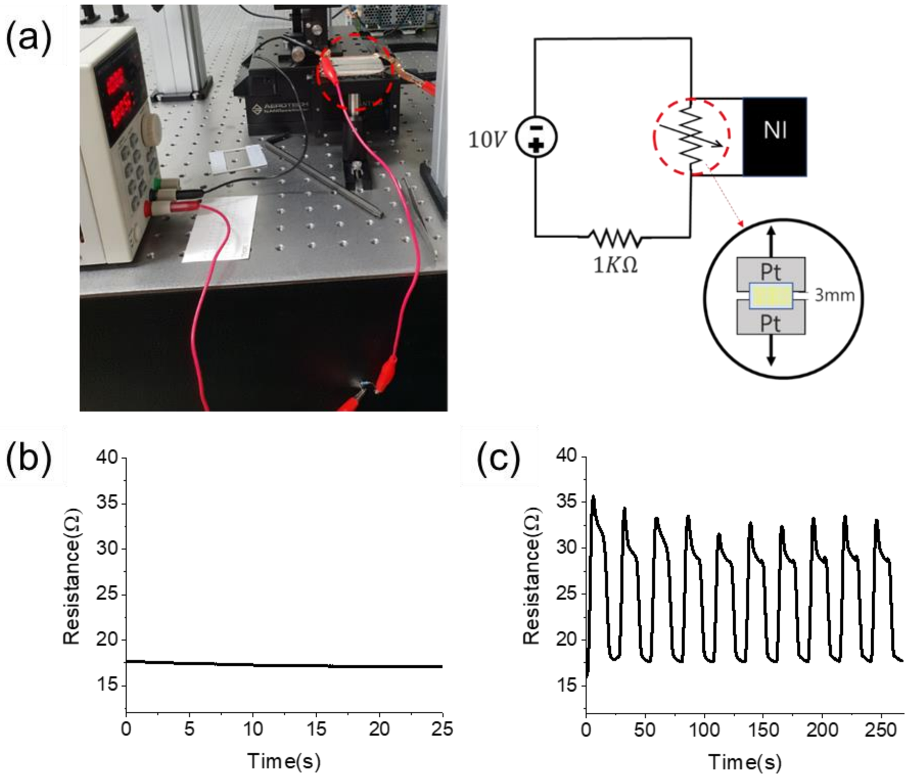
Supporting Figure S3. SEM image of the wrinkles found in the vicinity of the laser transferred Ag electrodes.



Supporting Figure S4. Pointwise EDS measurement on the laser-transferred Ag electrode and the non-irradiated PDMS film.



Supporting Figure S5. Resistance measurement of Ag NP layer (a) before and (b) after the laser transfer.



Supporting Figure S6. (a) Experimental setup for the resistance measurement; (b, c) Time-dependent resistance of the transferred Ag microline: (b) without mechanical stimuli; (c) under repeated tensile strain at 0.3 %.