

Electronic Supplementary Information

Titanium hydride nanoparticles and nanoinks for aerosol jet printed electronics

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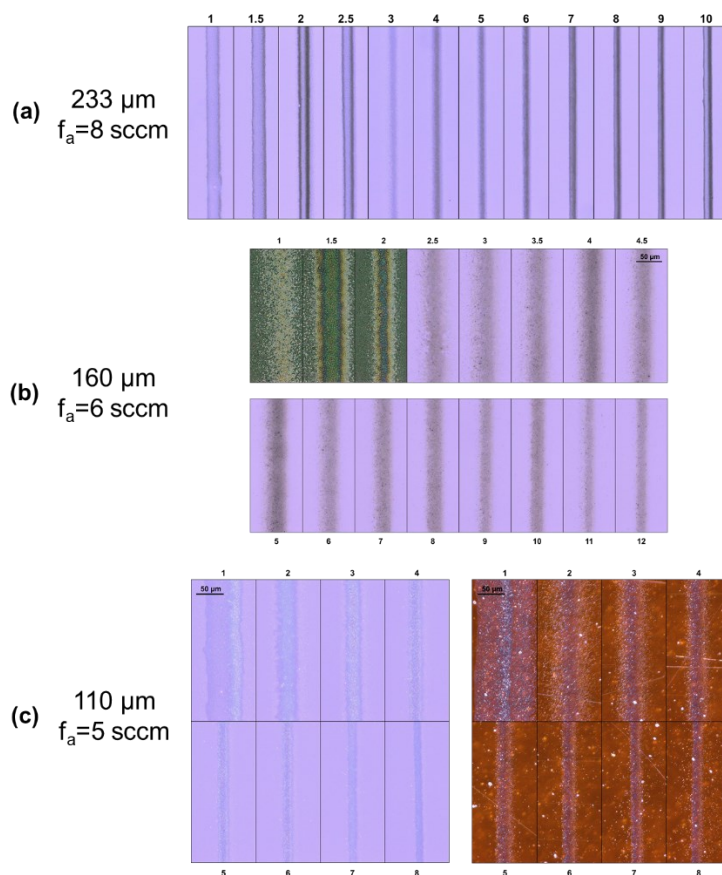


Figure S1. Microscopy images of aerosol jet printed lines. (a) Lines printed on glass with a 233 μm diameter nozzle, an aerosol flow rate of 8 sccm, and a focusing ratio of 1-10. (b) Lines printed on glass with a 160 μm diameter nozzle, an aerosol flow rate of 6-8 sccm, and a focusing ratio of 1-12. Note that for lines with focusing ratio of 1-2, the aerosol flow rate was increased to 8 sccm to maintain a dense line; all other lines were printed with an aerosol flow rate of 6 sccm. (c) Lines printed on glass and polyimide with a 110 μm diameter nozzle, an aerosol flow rate of 5 sccm, and a focusing ratio of 1-8.

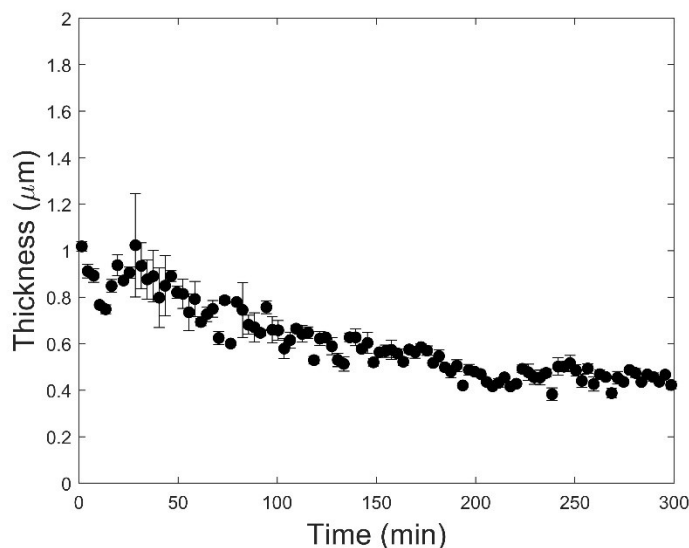


Figure S2. Print stability test. Thickness of aerosol jet printed films, showing some drift in deposition rate with continuous printing over 5 hours.

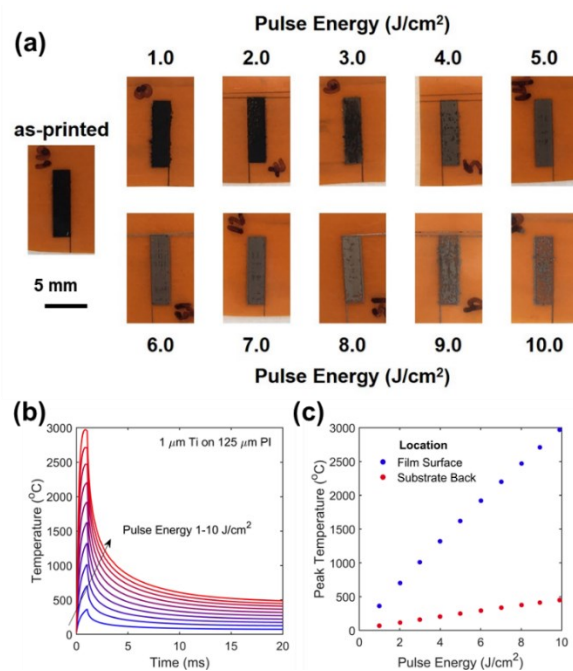


Figure S3. Photonic curing of printed TiH₂ patterns on polyimide. (a) Photographs of films as-printed and following photonic curing at different pulse energies from 1-10 J/cm². (b) Simulated temperature evolution at the film surface for pulse energies from 1-10 J/cm². (c) Peak temperature from simulations at the film surface and back side of the substrate, for pulse energies from 1-10 J/cm².

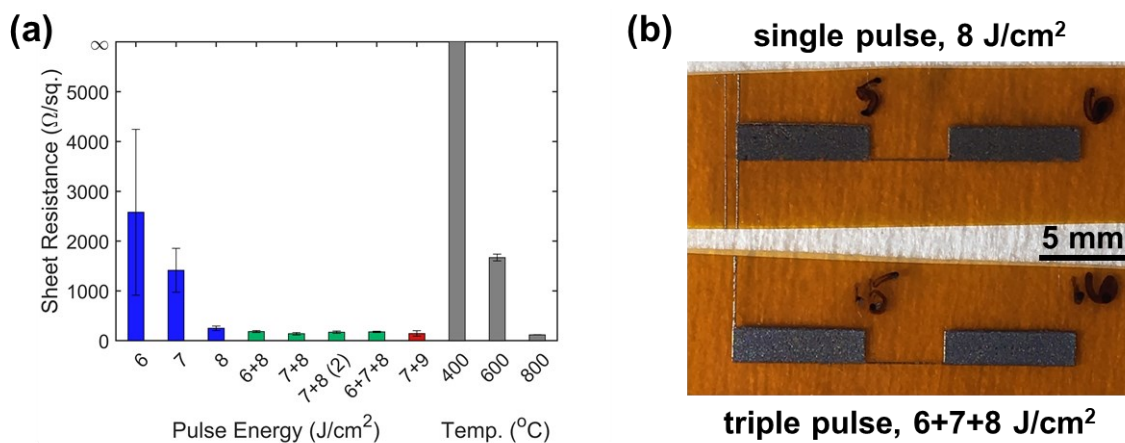


Figure S4. Photonic curing with multiple pulses. (a) Sheet resistance for various pulse conditions. The gray bars at right indicate corresponding values of sheet resistance for films thermally sintered under inert atmosphere. (b) Optical images showing more lustrous appearance of films following multiple light pulses.

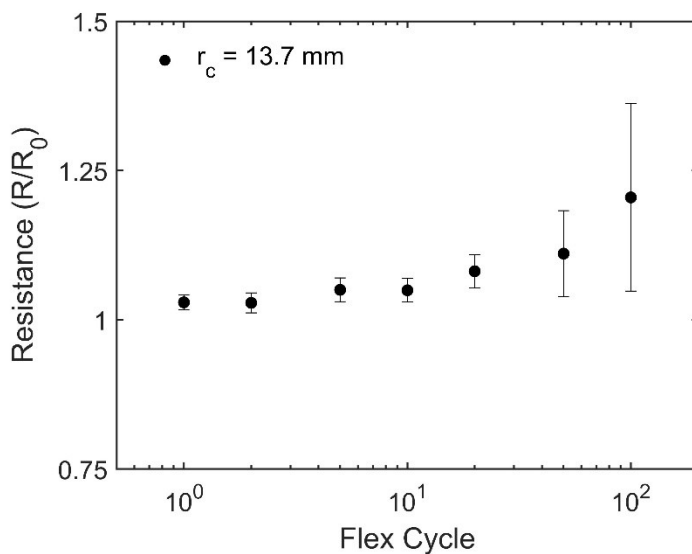


Figure S5. Electrical resistance following repetitive bending, showing a modest increase in resistance.

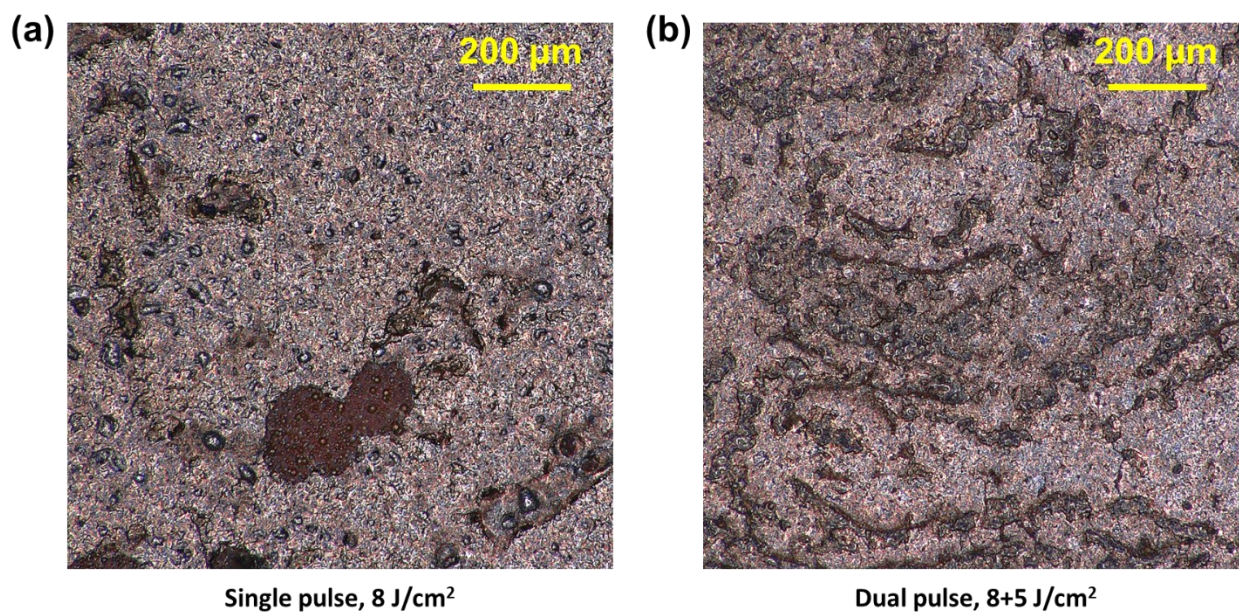


Figure S6. Optical microscopy images of thicker films following photonic curing with a single pulse (a) and multiple pulses (b).