

Electronic Supplementary Information

Sub-second carbon-nanotube-mediated microwave sintering for high-conductivity silver patterns on plastic substrates

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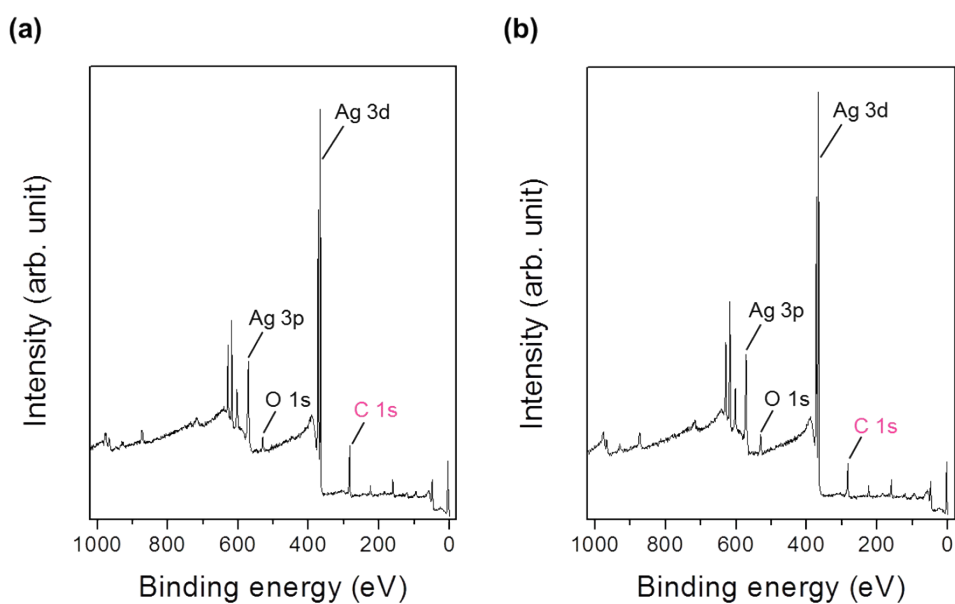


Fig. S1 XPS data of Ag lines on PI (a) before and (b) after microwave sintering at 350 °C, which show the reduction in atomic carbon content.

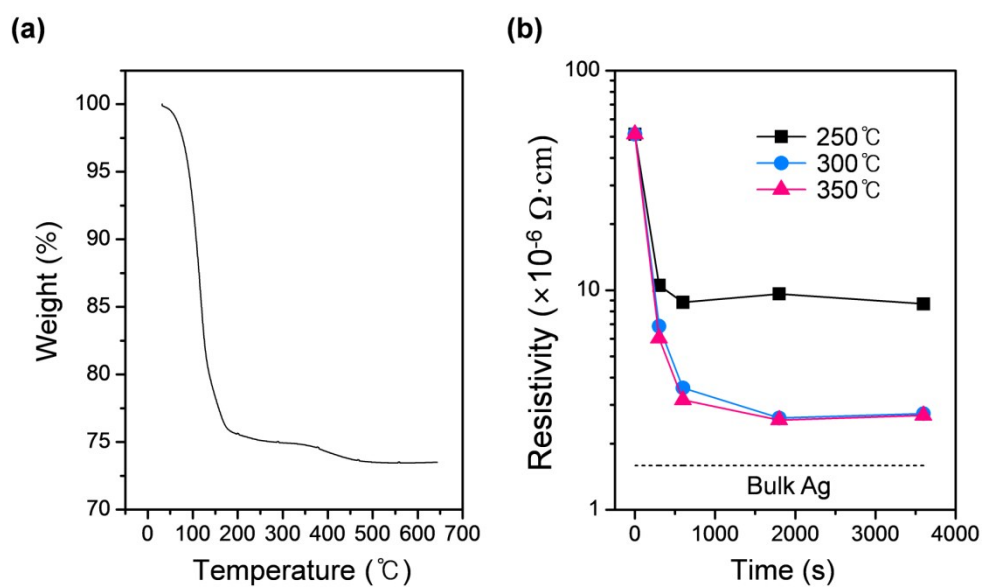


Fig. S2 (a) TGA data of the Ag ink as a function of temperature. (b) Resistivity of Ag lines as a function of thermal sintering time at temperatures ranging from 250 °C to 350 °C.

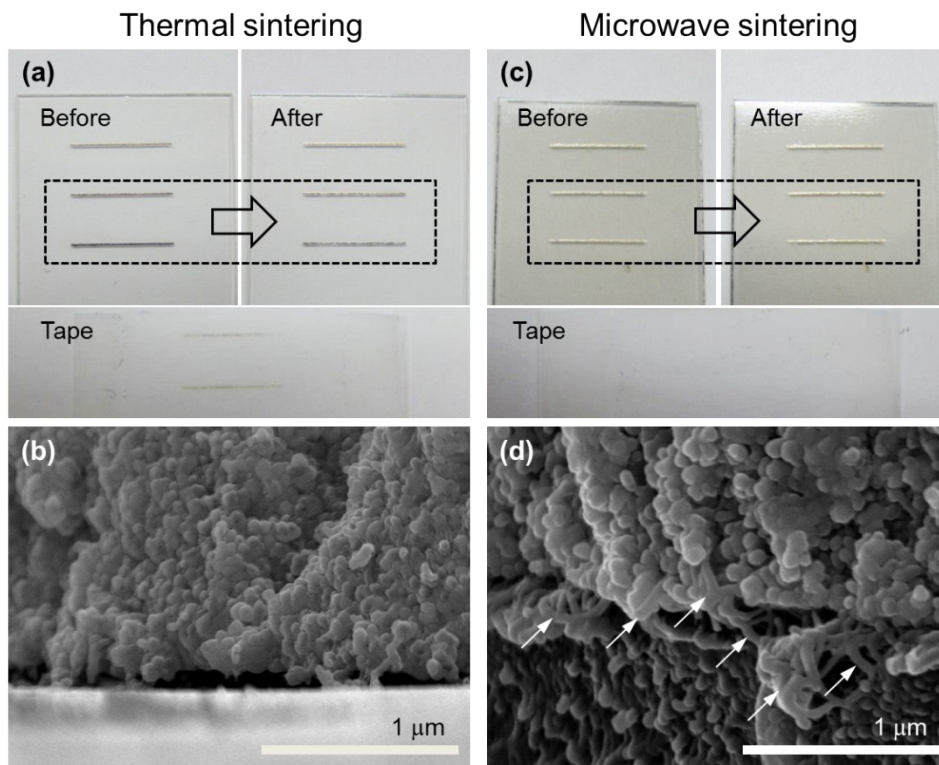


Fig. S3 Typical tape tests for Ag lines' adhesion to PC substrates after thermal and microwave sintering. (a) Tape test result and (b) cross-sectional FE-SEM image of Ag lines that were thermally sintered at 140 °C for 30 s; the image in (b) reveals spaces between the thermally sintered Ag lines and substrates. (c) Tape test result and (d) cross-sectional FE-SEM image of Ag lines that were microwave-sintered at 300 °C for 0.6 s, showing better adhesion to the PC substrate than the thermally sintered lines in (a) and (b); the image in (b) also shows that the microwave-sintered lines were connected to the substrate via CNTs.

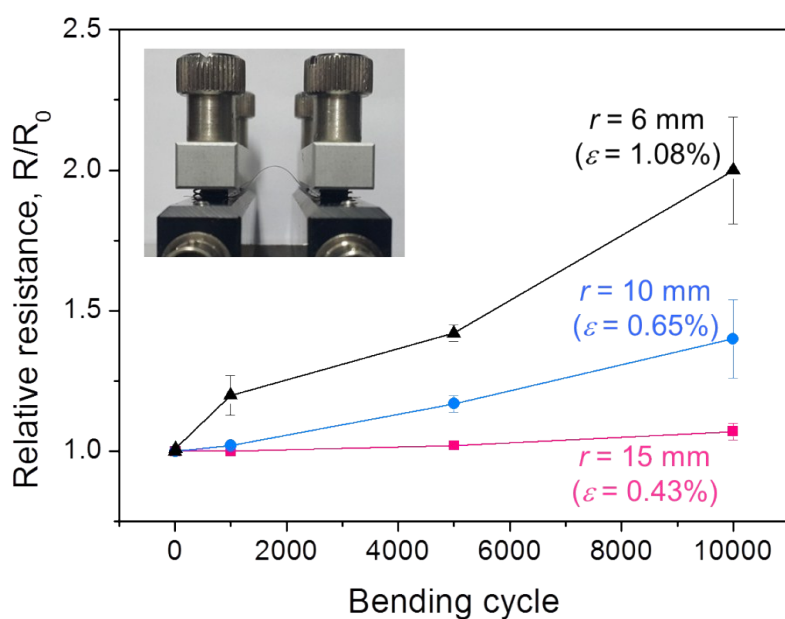


Fig. S4 Relative resistance of Ag/CNT lines on PET for various bending radii and strains in 10,000 cycles when sintered by microwaves at 70 °C for ~0.3 s. The inset shows the sample under test when the bending radius was 10 mm.



Fig. S5 Flexible touch piano consisting of a CNT touch keyboard, Ag interconnects, an Arduino-based control board, and a speaker. Movie S1 shows that we were able to play a tune ('Twinkle Twinkle Little Star') on this touch piano.