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# Flexible carbon nanotube-enriched silver electrode films with high electrical conductivity and reliability prepared by facile screen printing

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Flexible electrode films play critical and fundamental roles in the successful development of flexible electronic devices. In this study, carbon nanotubes (CNTs) were implanted into silver (Ag) ink to enhance the electrical conductivity and the reliability of the printed Ag electrode films. The fabricated carbon nanotubes-enriched silver (Ag-CNTs) electrode films were printed on the polyimide substrates by a facile screen printing method and sintered at a relatively low temperature. The resistivity of Ag-CNTs films was decreased by 62.27% compared with the pure Ag film. Additionally, the Ag-CNTs films exhibited excellent flexibility under a bending radius of 4 mm (strain  $\varepsilon = 2.09\%$ ) over 1000 cycles. Furthermore, the Ag-CNTs film displayed unchangeable electrical conductivity together with a strong adhesion after an accelerated aging test with 500 thermal shock cycles. These improvements were attributed to the Ag-CNTs interconnected network structure, which can provide electronic transmission channels and prevent cracks from initiating and propagating.

*Key words:* Flexible silver electrode films; Carbon nanotubes; Screen printing; Electrical conductivity; Reliability; Adhesion strength

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