Cupronickel Nanowire Networks for Future Flexible Touch Sensor Display Applications

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Copper nanowires have attracted attention as transparent conductor for display application due to their excellent electrical conductivity and low cost of fabrication. This study investigated Nickel coating of copper NW's to form NW networks for flexible touch-sensor display applications. In this study Cu-NW's with Ni cladding enabled formation of well-aligned bi-directional network using magnetic field with excellent electrical resistance and high optically transparency on flexible electrodes. The sheet resistance as low as 60 O/square was observed with 92% optical transparency by using Acetic acid cleaning chemistry. Exposing the Ni/Cu NW networks to 100? under ambient conditions demonstrated excellent thermal stability with only 12% variation in sheet resistance after duration of 5 days, demonstrating viability of Ni cladding in addressing Cu-NW oxidation. Ni/Cu NW networks deposited on plastic substrate (PET) demonstrated the stable resistance with the standard deviation in sheet resistance of ~3% after 500 bending cycles. Excellent resistance vs. optical transmission characteristics, stability during mechanical bending, and oxidation resistance at high temperatures demonstrated in this study show viability of Ni-coated Cu-NW for flexible touch-sensor display applications.

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