Enhanced conductivity of transparent and flexible silver nanowire electrodes fabricated by a solution-processed method at room temperature

Xiuzhen Lin, Shuming Chen, Jianning Yu, Kai Wang, Dan Luo, Xiaowei Sun, Xinhai Zhang

PII: S0040-6090(17)30027-5
DOI: doi: 10.1016/j.tsf.2017.01.027
Reference: TSF 35739

To appear in: *Thin Solid Films*

Received date: 24 August 2016
Revised date: 29 December 2016
Accepted date: 13 January 2017

Please cite this article as: Xiuzhen Lin, Shuming Chen, Jianning Yu, Kai Wang, Dan Luo, Xiaowei Sun, Xinhai Zhang , Enhanced conductivity of transparent and flexible silver nanowire electrodes fabricated by a solution-processed method at room temperature. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Tsf(2017), doi: 10.1016/j.tsf.2017.01.027

Enhanced conductivity of transparent and flexible silver nanowire electrodes fabricated by a solution-processed method at room temperature

Xiuzhen Lin, Shuming Chen, Jianning Yu, Kai Wang, Dan Luo, Xiaowei Sun, Xinhai Zhang*

Department of Electrical and Electronic Engineering, South University of Science and Technology of China, Shenzhen, Guangdong, 518055, China

*Corresponding author, email: zhang.xh@sustc.edu.cn

Abstract

A simple method was developed to increase the electrical conductivity of Ag nanowire (NW) transparent electrodes prepared at room temperature. By dipping Ag NW coated poly(ethylene terephthalate (PET) film into AgBr solution with sodium ascorbate as reductant, Ag nanoparticles grow on the surface of Ag NWs and their junction positions. It was found that the attachment of Ag nanoparticles on Ag NWs decreases the electrode film resistance from 220~300 Ohm/sq to 30~50 Ohm/sq, which is mainly due to the change in junction resistance with Ag nanoparticles functioning as a bridge for electron transportation between Ag NWs. Ag NW coated PET films have a transmittance of 85.0 % at the spectral wavelength of 550 nm, and this value does not change much after AgBr treatment. A mechanical study shows that Ag NW electrodes on flexible substrates have excellent robustness subjected to bending. The properties of transparent Ag NW electrodes prepared using our method meet the requirements of transparent electrodes for many applications and could be a replacement for indium tin oxide for flexible electronics and solar cells.