

Environmental friendly water-based solution process for fabrication of Ag nano-mesh with high adhesion strength to substrate.

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Recently, the metal mesh electrodes are considered as promising transparent electrodes that possess high optical transmittance while maintaining sufficient electrical conductivity. Here, we report an effective approach for transparent Ag nano-mesh prepared by all water-based solution process. The Ag mesh electrodes were formed by combination of colloidal Au nanoparticles deposition and silver enhancement. The smallest feature size of the obtained metal mesh patterns is about 700 nm with a thickness of 30–60 nm. Our Ag nano-mesh exhibit not only excellent electrical conductivity with a sheet resistance of 70 Ω/sq at a transmittance of 96.2% but also strong adhesion strength to substrate which is confirmed by peeling off test. The Ag mesh electrodes is applied to transparent heater which is able to heat up to 250 °C at 7 V. Through this study, high performance transparent electrodes with Ag mesh structures are realized by simple, environmentally benign, and low cost process.