

Silver-coated copper nanoparticles for solution printing process

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Recently, solution printing process to fabricate conductive features has attracted attention because it enables low-cost preparation and large-area fabrication of electronic devices. To date, noble metals have been used in solution based-process due to their high conductivity and air-stability, but high price of them hinders to make these materials to be used in low-cost solution printing. So, Cu is considered as an alternative since it has a comparable conductivity and is much cheaper than noble metals. However, the natural formation of oxide layer on the surface of Cu particles leads to lowered conductivity and increased sintering temperature. The oxide layer makes it difficult for Cu particles to be utilized in printing of electronic devices. As the size of particles becomes smaller, the oxidation problem becomes more serious. Therefore, Cu nanoparticles require an artificial passivation layer to prevent oxidation. We prepared Ag-coated Cu nanoparticles via spray pyrolysis in one-step and proved that this process is more effective than a two-step process. The presence of silver layer was confirmed microscopically and macroscopically. Furthermore, thin film prepared from the Ag-coated Cu nanoparticles were also tested.