

Conformal deposition of copper based materials on vertically grown ZnO nanowire arrays

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Copper and its oxides (Cu, Cu<sub>2</sub>O, and CuO) have been used as one of the shell materials on ZnO nanowires in many reports for the applications such as solar cells and methanol reforming catalyst. Many methods were used for the synthesis of copper based materials such as anodic oxidation, sputtering, electrodeposition and electroless deposition (ELD). However, all the deposition methods for copper based materials on high aspect ratio nano structures have inherent drawback of non-conformal deposition due to the use of line-of-sight methods and diffusion-limited deposition. In this work, we demonstrate selective deposition of copper based materials on ZnO NW arrays by an electrophoretic assisted electroless chemical deposition. For this work, vertically long ZnO NW arrays were synthesized by the hydrothermal method. The selective deposition of copper based materials on ZnO NW arrays is performed with the changes of solution composition of the electrophoretic assisted electroless chemical deposition. The conformal ZnO/Cu based core-shell nanowire arrays with high aspect ratio will provide a promising platform for future energy applications.