

Producing the $\text{Cu}_2(\text{Zn},\text{Sn})\text{S}_4$ solar cell with ZnO nanostructure through solution based process

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Solar energy is one of promising future energy sources. Among many solar cells, second generation solar cell is thought as a proper solar cell for utilization. $\text{Cu}_2(\text{Zn},\text{Sn})\text{S}_4$ (CZTS) thin film solar cell is paid attention because of its high absorption coefficient, cost and abundant of materials, adjustable band gap, high incident photon conversion efficiency, good stability and so on. However, high efficiency cell usually required high vacuum conditions which would lead to high cost and limitation on mass production. This research tried to produce CZTS solar cell at low temperature with non-vacuum condition using solution coating. The solution containing Cu, Zn, Sn and S was spin-coated on ZnO/CdS nanowire core-shell structure, which made a superstrate structure solar cell. The nanostructure let contact area at each layer larger so that higher efficient light absorption and carrier transfer were possible. SEM, XRD, UV-transmittance were also measured. In conclusion, superstrate CZTS solar was produced using solution process at low temperature with room pressure. The cell with ZnO nanostructure could show better efficiency than earlier superstrate solar cell.