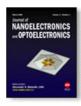
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Sol–Gel Derived Cu(In,Ga)Se₂ Thin Film Solar Cell

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Abstract:

Well crystallized copper indium gallium (di)selenide-Cu(In,Ga)Se₂ (CIGS) thin films were deposited on conducting substrates (molybdenum coated soda-lime glass) by sol-gel dip coating technique. The n-type cadmium sulfide (CdS) buffer layer was produced by chemical bath deposition (CBD) technique and the n-type ZnO:Al thin film has been used as transparent conductive layer was deposited by sol-gel dip coating technique. The selenium powder was dissolved in trioctylphosphine (TOP, 90%, technical grade) solution during the experiment process to make some progress on scientific innovation of CIGS thin films derived by sol-gel dip coating technique. Hence, the heterojunction at Mo/CIGS/CdS/ZnO:Al/Al configuration was produced on a soda-lime silicate glass substrate (SLSG). SLSG/Mo/CIGS/CdS/ZnO:Al/Al heterojunction was fabricated by using a practical economical and more ecofriendly technique. The structural, optical and current-voltage (I-V) characteristics of the CIGS based heterojunction was analysed by using the SLSG/Mo/CIGS/CdS/ZnO:Al/Al device configuration. The optoelectronic properties such as the open-circuit voltage (V-oc), the short-circuit current (I-sc), the fill factor (FF), the ideality factor (I) etc. of the CIGS thin film solar cells were examined depending on the annealing temperature at 500 °C for 45 minutes in air. The CIGS thin film heterojunctions which has been obtained present diode like rectifying behaviour besides photovoltaic behaviour under UV illumination.

Keywords: CIGS; DIODE; SOLAR CELL; SOL-GEL; THIN FILM

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