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The effect of copper concentration on CdS/CZTSheterojunction properties

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Abstract: Cu2ZnSnS4 (CZTS) / CdS heterojunctions have been prepared by a successive deposition of CZTS and CdS thin films on glass substrates by spray pyrolysis and chemical bath deposition techniques respectively. The concentration of cupric chloride in the starting solution has been varied in order to investigate its influence on device properties. The realized CZTS/CdS heterojunctions were characterized by recording their IV characteristics at ambient and at different temperatures. The current-voltage (IV) characteristics of the different heterostructures exhibit a rectifying behavior with a good ideality factor ranged from 1.5 to 2.7. From these IV characteristics we have deduced the saturation current series resistance and barrier height of the devices. We found that these quantities vary from 0.22 to 1.68µA for the saturation current and from 300 to 2500 for the series resistance. We have deduced also that the potential barrier was found between 0.3 and 1.31eV. From these results we inferred that the realized structures are suitable for their applications as solar cells.

Keywords : CZTS; heterojunction; spray pyrolysis; solar cells;IV