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CZTS solar cell: A green energy source produced in a green way.

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Abstract content (Max 300 words) Formatting & Special chars

A solar cell can be produced by using low-cost, abundant and non-toxic constituent elements. This can be done using inexpensive production methods including electroplating and electron beam evaporation. It is possible to select the constituent elements as well as the chemicals used during the production to have as little as possible environmental impact. A micrometer thick layer of molybdenum evaporated onto soda-lime glass is used as a substrate, the glass can be replaced with a flexible substrate to produce a flexible solar cell. Cu₂ZnSnS₄ (CZTS) is used as the absorber layer of a solar cell because it is a p-type semiconductor with a bandgap of about 1.45 eV. A Cu-Zn-Sn precursor layer is also electrodeposited in one step using a deep eutectic solution consisting of choline chloride and urea. This type of ionic solution is classified as "green chemistry", due to the low environmental impact of the chemicals involved. The Cu-Zn-Sn layer is deposited by electron beam evaporation. The CZTS layer is then formed by annealing it in a sulfur containing atmosphere. The rest of the solar cell is an n-type layer consisting of zinc oxide combined with either magnesium or sulfur to modify its conduction band offset, followed by a zinc sulfide window layer. Characterisation of the layers is done using X-ray diffraction, Auger electron spectroscopy, Scanning electron microscopy, X-ray photoelectron spectrometry. Preliminary results will be presented.

Apply to be considered for a student award (Yes / No)?

Yes

Level for award (Hons, MSc, PhD, N/A)?

MSc

Main supervisor (name and email) and his / her institution

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