



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

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Solar power is undoubtedly the most abundant and accessible renewable energy source available to us. CZTS ($\text{Cu}_2\text{ZnSnS}_4$) solar cells are a promising alternative to the current solar cells on the market, because of their low cost and low environmental impact. The focus points of this research is not only the elements and chemicals used in the manufacturing, but also to the manufacturing processes itself, in order for the production of these solar cells to be as simple, inexpensive and environmentally friendly as possible. An electroplating apparatus has been developed, including a low cost potentiostat and power source along with the operating software.

Cu, Zn and Sn are electroplated to form a precursor layer. The electrolyte used is a deep eutectic solvent that is inexpensive, environmentally safe and an excellent alternative for electroplating processes. The solar cell will consist of glass substrate coated in Mo to form a bottom contact. The CZTS layer is the p-type semiconductor layer with a bandgap of about 1.45 eV, doped ZnO will be used for an n-type layer, followed by a ZnS window layer.

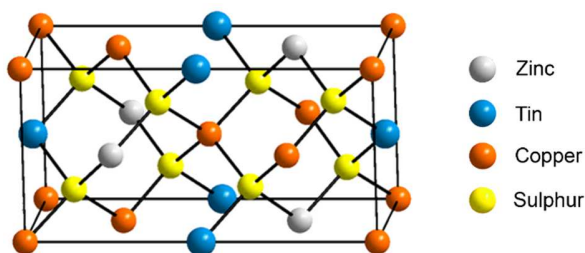


Fig. 1: The crystal structure of the CZTS layer.

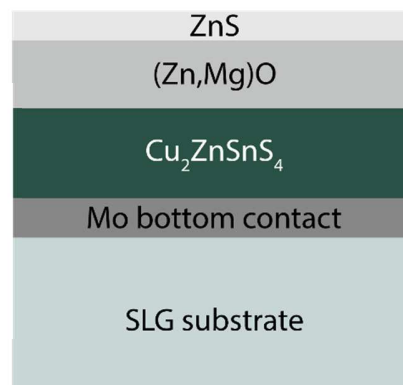


Fig. 2: The layers that form the solar cell.