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Electrodeposition Study of Alloys for Solar Energy Application

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Abstract

Copper zinc tin sulfide (CZTS) compound is one of the compounds which has recently researchers started studying in-depth due to its valuable applications, especially in the thin-film solar cells. Since the late 2000s, many researchers start investigating CZTS to hopefully replace the current CIGS thin-film solar cells due to many problems and difficulties in making it. Manufacturing CIGS thin-film solar cells have great health hazard issues and its elements are controlled logistically by few countries in the world. On the other hand, copper zinc tin sulfide can be found almost everywhere and it does not have high health risks to make. Nevertheless, it is a fairly new studied compound with very low efficiency but has high theoretical potential due to its unique properties such as bandgap. The behavior of the copper-zinc tin sulfide will be studied to hope to have a better understanding of the system and yield better control of the desired product. Furthermore, the study will be done using the electrodeposition method due to its cost-effectiveness and easiness comparing to all other methods out there. Additionally, the interaction of the CZTS elements will be examined which will yield multiple alloys such as brass and bronze. There are various properties for each alloy which results in using them in different applications. Photovoltaic cells could be one of the major applications of the CZTS thin-film system which could be integrated into many substrates such as flexible polymers and glass. Thus, investigating the behavior will get scientists a better understanding of the reaction which later on could be controlled to get the desired product and thickness.

Keywords
Solar energy, Thin film CZTS, Semiconductor, Photovoltaic and Electrodeposition.

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