Research Project: Low Cost Photovoltaic Solar Cells

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Summary

This project was aimed at exploring the possibility of developing a low cost photovoltaic solar cell using the techniques that can be easily adapted in this country. The investigation was concentrated on the very inexpensive semiconducting materials of Cu_2O and Cu_2S and also their very inexpensive preperation methods. Whole investigation was carriedout for electrochemical methods only. The detail photoelectrochemical investigation has revealed that the method of preperation of Cu_2O films by electrodeposition is not only producing n-Cu_2O but also unwanted p-Cu_2O. It was found that the p-Cu_2O give short-circuiting paths in the cell producing low efficiency. The maximum energy conversion efficiency of this Cu_2O/Cu_xS Thin Film Solar Cell is 0.1%. However, this value is comparable with the maximum reported value of 1%, that was obtained with sophisticate methods.

In order to improve this system it is undoubtly the Cu_2O preperation method has to be improved. Also, the detail current transport mechanisms at the heterojunction has to be studied. Another possibility of improving the efficiency of the Cu_2O system is to investigate further on other possible heterojunctions that might be usful.