

SOLAR ENERGY PHOTOVOLTAICS FOR SUSTAINABLE ENERGY AND ENVIRONMENT

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ABSTRACT

In view of the current environmental problems which have posed to threaten the very existence of human life on earth, it is high time to switch to non-conventional sources of energy so as to have a sustainable form of living. India, being a tropical country, has immense potential in tapping solar energy with the state of Kerala receiving an annual solar radiation of 5.5 KWh/m²/day. The recent Kerala floods and landslides followed by drought, changed rain pattern affecting agriculture, all are the consequences of global warming and non-sustainable way of living. One of the immediate measures to combat environmental degradation is to depend on solar energy for our energy demands by relying on solar cells. There has been reluctance among the general public in depending on solar energy mainly due to initial cost of installation. But recent research on solar photovoltaics aims to bring down the cost of materials used in solar cells by incorporating the use of earth abundant materials in absorber layer and window layer which can possibly make them affordable for their use in households too. Most of the research is progressing in the use of earth abundant photovoltaic materials like ternary and quaternary chalcogenides of copper and to increase its efficiency by various techniques. This paper gives a review on the efficiencies achieved so far for solar cells using silicon, quaternary and ternary chalcogenides, perovskites etc. An attempt has also been made in the preparation of copper tin sulphide quantum dots using a green synthesis technique and capped with natural dyes so as to increase the efficiency of solar cells.

Keywords: Environmental degradation, sustainable living, non-conventional sources of energy, photovoltaics, solar cells.