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COMPACT CPV – SUSTAINABLE APPROACH FOR EFFICIENT SOLAR ENERGY CAPTURE AND SUNLIGHT TO HYDROGEN CONVERSION

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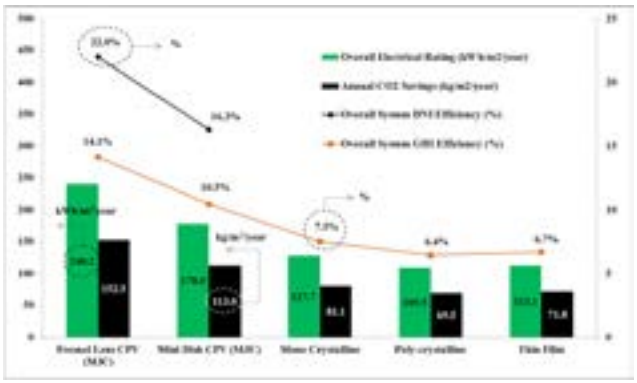
Solar energy being intermittent in nature can provide a sustainable, steady and high density energy source when converted into electrolytic hydrogen. However, in current photovoltaic market trend with 99% conventional single junction PV panels, this cannot be achieved efficiently and economically. The advent of the multi-junction solar cells (MJCs) with cell-efficiency exceeding 46%, has yet to receive wide spread acceptance in the current PV market in form of concentrated photovoltaic (CPV) system, because of its system design complexity, limiting its application scope and customers. The objective of this paper is to develop a low cost compact CPV system that will not only eliminate its application and installation related restrictions but it is also introducing a highly efficient and sustainable photovoltaic system for common consumer, to convert intermittent sunlight into green hydrogen. The developed CPV system negates the common conviction by showing two times more power output than the flat plate PV, in tropical region. In addition, sunlight to hydrogen conversion efficiency of 18% is recorded for CPV, which is two times higher than alone electricity production efficiency of flat plate PV.



Recent Publications

1. **Muhammad Burhan, Shahzad M W and Kim Choon Ng (2018) Hydrogen at the rooftop: compact CPV-hydrogen system to convert sunlight to hydrogen. Applied Thermal Engineering 132:154-164.**
2. **Muhammad Burhan, Shahzad M W, Seung Jin Oh and Kim Choon Ng (2018) A pathway for sustainable conversion of sunlight to hydrogen using proposed compact CPV system. Energy Conversion and Management 165:102-112.**
3. **Kim Choon Ng, Muhammad Burhan, Shahzad M W and Ismail A B (2017) A universal isotherm model to capture adsorption uptake and energy distribution of porous heterogeneous surface. Scientific Reports 7(1):10634.**
4. **Muhammad Burhan, Seung Jin Oh, Chua K J and Kim Choon Ng (2017) Solar to hydrogen: Compact and cost effective CPV field for rooftop operation and hydrogen production. Applied Energy 194:255-66.**

Biography

Muhammad Burhan is working as a Postdoctoral Fellow in the Water Desalination and Reuse Center of King Abdullah University of Science and Technology. He has completed his PhD degree from the National University Singapore (NUS) in 2016. He obtained his Bachelor's degree in Mechanical Engineering from University of Engineering & Technology (UET) Lahore, Pakistan in 2011. To date, he has published 17 peer-reviewed journal papers. He also received two best paper awards in international conferences.

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