Patent Search

Invention Title	Hybrid Semiconducting Nanomaterials for Improved Solar Harvesting Efficiency in Photovoltaic Cells
Publication Number	45/2023
Publication Date	10/11/2023
Publication Type	INA
Application Number	202331059005
Application Filing Date	03/09/2023
Priority Number	
Priority Country	
Priority Date	
Field Of Invention	ELECTRONICS
Classification (IPC)	H01L0051420000, B82Y0030000000, H01L0031054000, H01L0051000000, H01G0009200000

Inventor

Name	Address	Country
Dr. Manoj Kumar Praharj	Assistant Professor, Department of Physics, Ajay Binay Institute of Technology, CDA-1, Markatnagar, Cuttack, Odisha, India, Pincode: 753014	India
Dr. P. Soundarrajan	Assistant Professor, Department of Science and Humanities, Knowledge Institute of Technology (Autonomous), Kakapalayam, Salem, Tamilnadu, India, Pincode: 637504	India
Dr. Chinthayyanaidu Rudram	Assistant Professor, Department of Chemical Engineering, Rajiv Gandhi University of Knowledge Technologies, Nuzvid, Andhra Pradesh, India, Pincode: 521202	India
Dr. Nellore Manoj Kumar	Independent Researcher, Infinite Research, Founder & CEO, 15-225, Gollapalem, Venkatagiri, Tirupati District, Andhra Pradesh, India, Pincode: 524132	India
Dr. Ikechukwu Peter Ejidike	Senior Lecturer, Department of Chemical Sciences, Faculty of Natural, Applied and Health Sciences, Anchor University, Lagos, Ikeja, Lagos, Nigeria, Pincode: 100278	Nigeria
Ms. Vaishnavi Raja	Research Scholar, Department of Physics, Mother Teresa Women's University, Attuvampatti, Kodaikanal, Dindigul, Tamilnadu, India, Pincode: 624101	India
Dr. M.S.N.A. Prasad	Assistant Professor, Department of Chemistry, Institute of Aeronautical Engineering (IARE), Dundigal, Hyderabad, Telangana, India, Pincode: 500043	India
Dr. M. P. Srinivasa Rao	Professor, Department of BS&H, GMR Institute of Technology, Rajam, Vizianagaram Dt, Andhra Pradesh, India, Pincode: 532127	India
Dr. Gosu Nageswara Reddy	Associate Professor, Department of Chemistry, Vel Tech Rangarajan Dr. Sagunthala R & D Institute of Science and Technology, Avadi, Chennai, Tamilnadu, Pincode: 600062	India
Dr. Shruthi D L	Assistant Professor, Department of Physics, Sai Vidya Institute of Technology, Rajanukunte, Bengaluru, Karnataka, India, Pincode: 560064	India

Applicant

Name	Address	Country
Dr. Manoj Kumar Praharj	Assistant Professor, Department of Physics, Ajay Binay Institute of Technology, CDA-1, Markatnagar, Cuttack, Odisha, India, Pincode: 753014	India
Dr. P. Soundarrajan	Assistant Professor, Department of Science and Humanities, Knowledge Institute of Technology (Autonomous), Kakapalayam, Salem, Tamilnadu, India, Pincode: 637504	India
Dr. Chinthayyanaidu Rudram	Assistant Professor, Department of Chemical Engineering, Rajiv Gandhi University of Knowledge Technologies, Nuzvid, Andhra Pradesh, India, Pincode: 521202	India
Dr. Nellore Manoj Kumar	Independent Researcher, Infinite Research, Founder & CEO, 15-225, Gollapalem, Venkatagiri, Tirupati District, Andhra Pradesh, India, Pincode: 524132	India
Dr. Ikechukwu Peter Ejidike	Senior Lecturer, Department of Chemical Sciences, Faculty of Natural, Applied and Health Sciences, Anchor University, Lagos, Ikeja, Lagos, Nigeria, Pincode: 100278	Nigeria
Ms. Vaishnavi Raja	Research Scholar, Department of Physics, Mother Teresa Women's University, Attuvampatti, Kodaikanal, Dindigul, Tamilnadu, India, Pincode: 624101	India
Dr. M.S.N.A. Prasad	Assistant Professor, Department of Chemistry, Institute of Aeronautical Engineering (IARE), Dundigal, Hyderabad, Telangana, India, Pincode: 500043	India
Dr. M. P. Srinivasa Rao	Professor, Department of BS&H, GMR Institute of Technology, Rajam, Vizianagaram Dt, Andhra Pradesh, India, Pincode: 532127	India
Dr. Gosu Nageswara Reddy	Associate Professor, Department of Chemistry, Vel Tech Rangarajan Dr. Sagunthala R & D Institute of Science and Technology, Avadi, Chennai, Tamilnadu, Pincode: 600062	India
Dr. Shruthi D L	Assistant Professor, Department of Physics, Sai Vidya Institute of Technology, Rajanukunte, Bengaluru, Karnataka, India, Pincode: 560064	India

Abstract:

A photovoltaic solar cell incorporating hybrid semiconducting nanomaterials is presented. The design integrates both organic and inorganic semiconductor materials nanoscale, optimizing light absorption, charge transport, and energy conversion. The innovative fusion leverages multi-bandgap absorption, efficient charge pathway potential mechanical versatility, leading to enhanced solar harvesting efficiency.

Complete Specification

Description:This invention relates to the domain of renewable energy, specifically to the design and development of photovoltaic (PV) solar cells. More particularly, t invention pertains to the integration of hybrid semiconducting nanomaterials into solar cells, with the goal of enhancing their light absorption efficiency, charge tra and overall energy conversion capabilities. These hybrid nanomaterials blend the properties of different semiconductor materials at the nanoscale, aiming to harne advantages of both organic and inorganic materials for superior solar energy harvesting.

Background of the invention:

The incessant global demand for energy, coupled with the growing concerns about the environmental ramifications of fossil fuel consumption, has accelerated the for sustainable and green energy alternatives. Solar energy, being abundant and clean, has emerged as a frontrunner in this quest. Photovoltaic (PV) solar cells, whi directly convert sunlight into electricity, have been central to harnessing this solar potential. However, while the adoption of solar cells has been steadily increasing, a concomitant need to improve their efficiency and reduce their cost to make solar energy more competitive with traditional energy sources.

For several decades, crystalline silicon has been the predominant material used in commercial solar cells, known for its stability and reasonably high efficiency. Yet, pursuit of higher efficiencies has led researchers to explore a variety of other materials, including organic semiconductors, perovskites, and inorganic thin films. Eac these materials presents its own set of advantages and challenges. For instance, organic semiconductors can be processed at low temperatures and offer flexibility suffer from lower efficiencies and shorter lifetimes. In contrast, inorganic materials like perovskites have shown tremendous promise in achieving high efficiencies v short span of research time, but concerns about their stability and potential environmental impacts still linger.

At the convergence of these explorations emerged the concept of nanoscale engineering, aiming to exploit the unique electronic, optical, and mechanical propertie

View Application Status