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Research areas : Hydrogen Production through water splitting

Title of the research : Transition metal chalcogenide (TMC) embedded TiO₂ nanocomposites for hydrogen production and photo degradation over extended solar irradiation



Current position : MPhil Student, University of Jaffna, Sri Lanka

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Description of current and past research:

Depletion of fossil fuel is gaining public attention and receiving more financial and legislative support. In addition, development in industrial and technological sectors results in severe environmental issues. Therefore, alternative ways need to be identified to overcome these challenges. Harvesting solar energy using potential materials is of prime for their applications towards energy and environmental processes. Hydrogen is a greener and reliable energy source and used as fuel for producing energy and it can be produced in different ways such as steam methane reforming, coal gasification, electrochemical water splitting and photocatalytic water splitting. Here we mainly focus on the photocatalytic water splitting to produce hydrogen because it is greener and there is no harmful gas emission during the process. Our work mainly focuses on studying the impact of the incorporation of nanocomposites for hydrogen production through water splitting over extended solar irradiation. Here, different type of nanomaterials is used to get an efficient amount of hydrogen evolution. The amount of hydrogen can be calculated quantitatively by using gas chromatographic measurements and these photocatalyst materials were used to degrade the hazardous organic material to non-hazardous molecules which got 100% photodegradation with direct sunlight within few hours of irradiation.

Journal publications:

1. Sivagowri, S.; Ravirajan, P.; Dhayalan, V.; Christy, A.A.; Yohi, S.; "CoS₂/TiO₂ Nanocomposites for Hydrogen Production under UV Irradiation" Materials 2019, 12(23),3882; <https://doi.org/10.3390/ma12233882>
2. Sivgowri, S.; and Shivatharsiny, R.; "Transition Metal Chalcogenide (TMC) Nanocomposites for Environmental Remediation Application over Extended Solar Irradiation" Nanocatalysts, Intech2012:13. <https://doi.org/10.1016/j.colsurfa.2011.12.014>