

GREEN HYDROGEN GENERATION FROM PETROCHEMICAL WASTEWATER

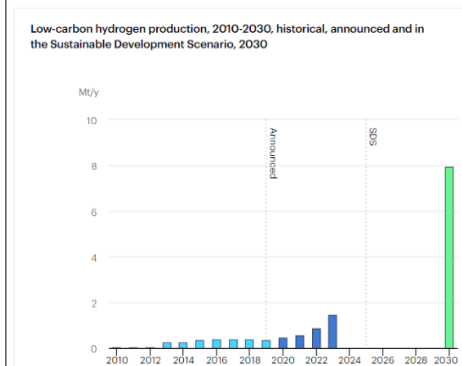
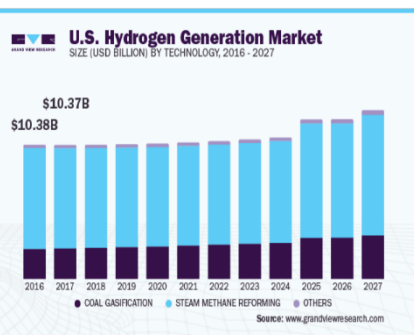
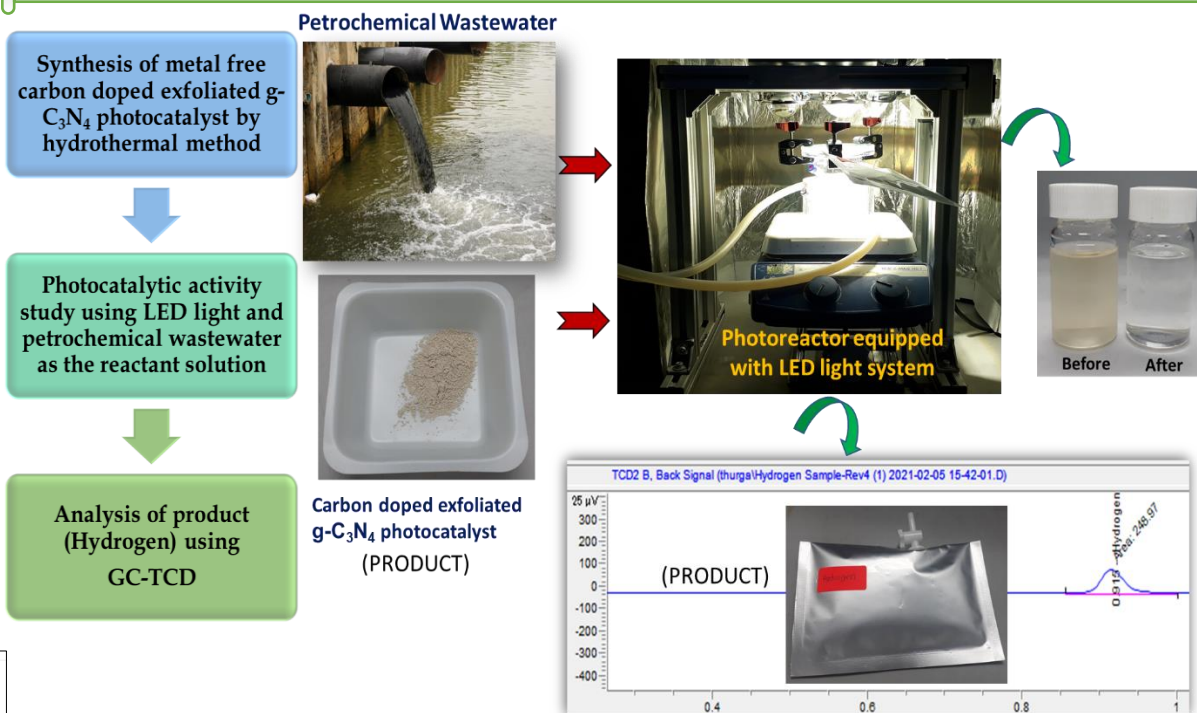
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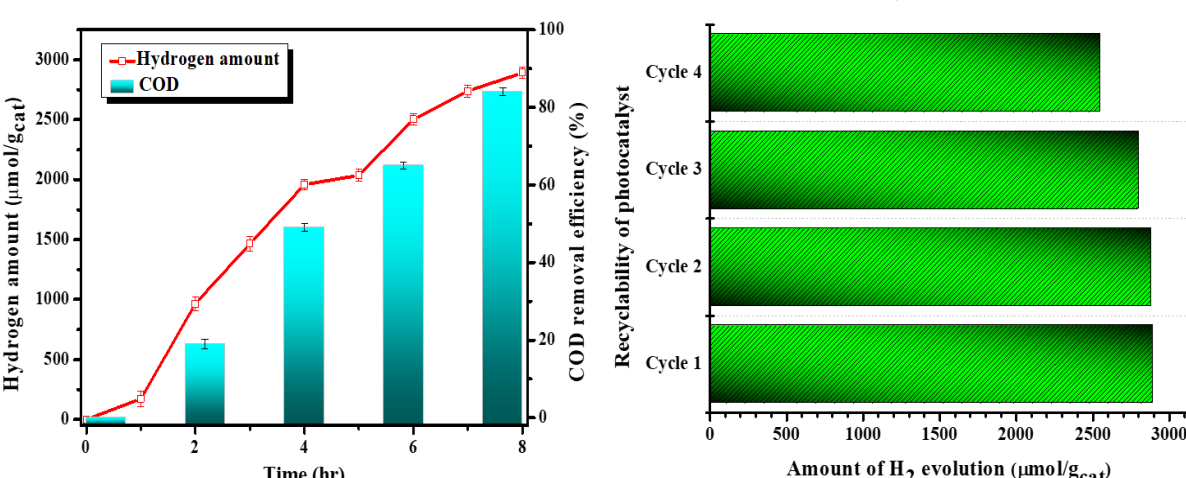
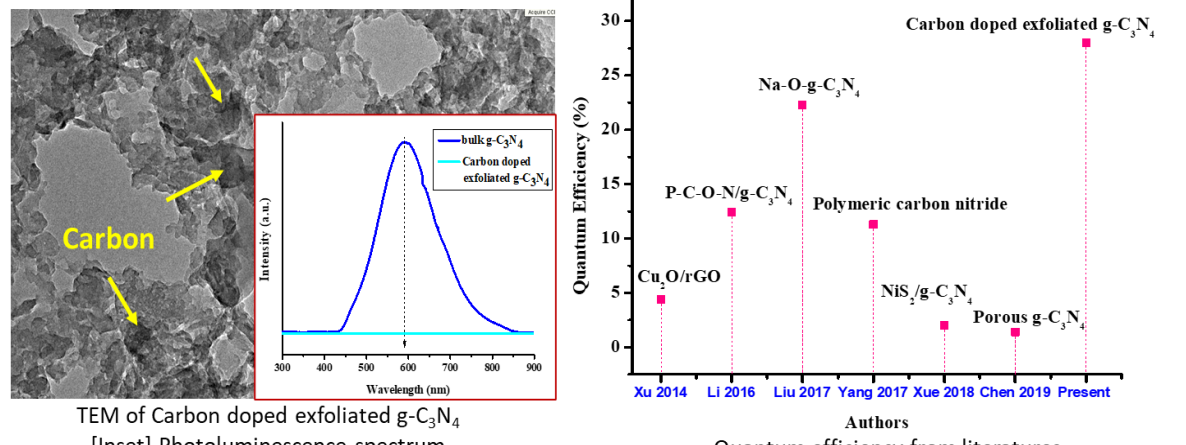
PRODUCT BACKGROUND

- The worldwide energy demand is expanding and demand for pure hydrogen is estimated around 70 Mt annually.
- This hydrogen currently is produced from 6% of global natural gas use and 2% of coal consumption, responsible for CO₂ emissions up to 830 Mt per year.
- Requirement for green hydrogen and alternative to conventional hydrogen production technologies are in need where photocatalytic pathway could be great choice.
- Most of the study uses noble metal as the co-catalyst but it is impractical to be used in large scale owing to high price.
- Majority of light sources used in the photocatalytic system are Xenon or Halogen lamp leading to huge heat dissipation.
- The focal point of present invention is fabrication of noble metal-free carbon doped exfoliated g-C₃N₄ photocatalyst and usage in dual process of hydrogen production and wastewater treatment under LED light irradiation.

STATE OF ART/METHODOLOGY



PRODUCT CHARACTERISTICS



CONCLUSION

- Photoreforming is a promising technology employed for green hydrogen production and wastewater treatment.
- The present study shows about 45.7 L/g.m³ of hydrogen was produced in the lab scale photoreactor under LED light irradiation.
- Quantum efficiency of 28% was achieved using carbon doped exfoliated g-C₃N₄.

BENEFITS/USEFULNESS

- Earth abundance materials as the photocatalyst
- Environmental friendly: Generation of hydrogen from wastewater
- Usage of LED light which consume less power and low heat dissipation

NOVELTY

- Carbon doped exfoliated g-C₃N₄ was used for the first time for green hydrogen production from petrochemical wastewater
- Development of novel photoreactor with fluidized LED light system

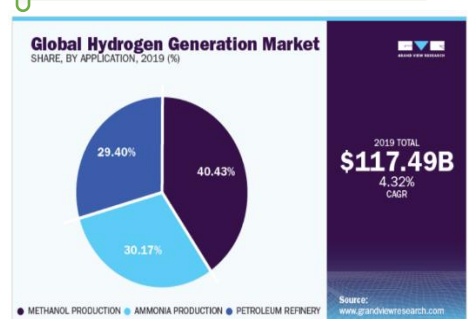
ENVIRONMENTAL IMPACT

- Green energy production with low carbon emission
- COD removal efficiency (84%)
- Industrial wastewater treatment

SUSTAINABILITY FACTORS

- Green energy
- Wastewater remediation using solar energy

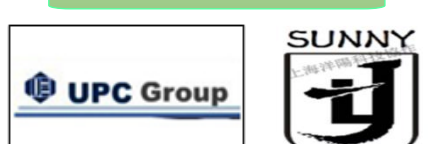
MARKETABILITY



PUBLICATION

- T.D Munusamy et al., 2021, Int.J.Hydrogen Energy,2021.01.176.
- T.D Munusamy et al., 2020, Mat.Today Proc.

COLLABORATIONS



ACKNOWLEDGEMENT

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