

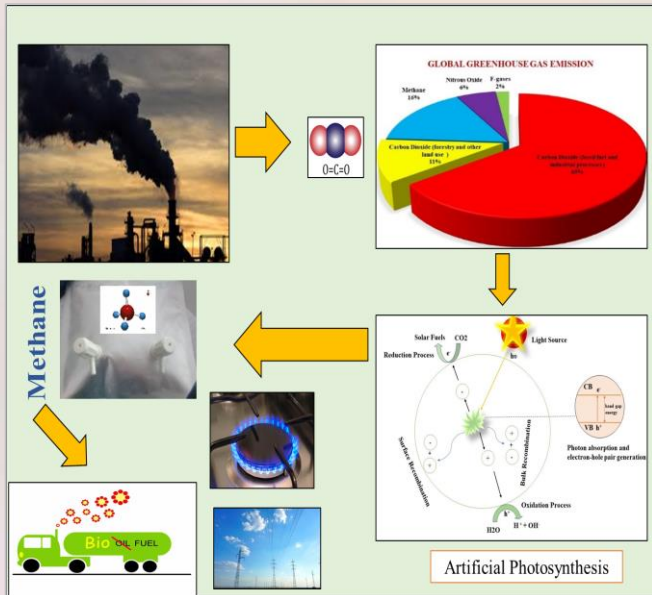
# Pt-TNTs FOR CONVERSION OF CARBON DIOXIDE TO METHANE



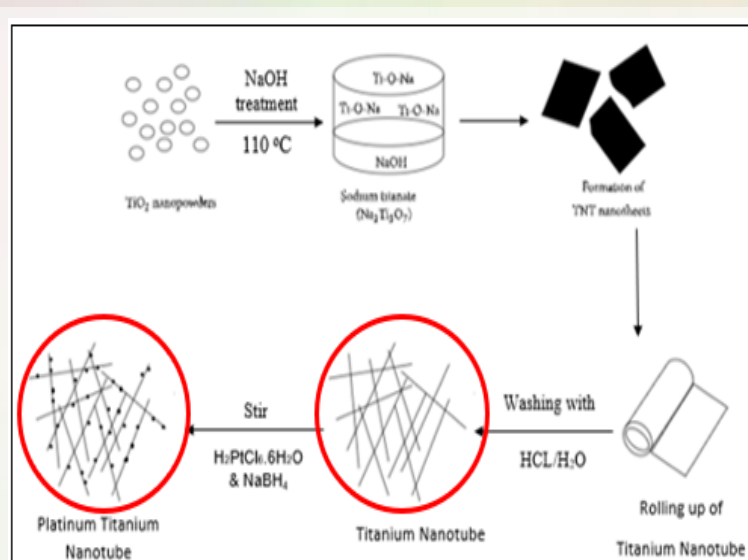
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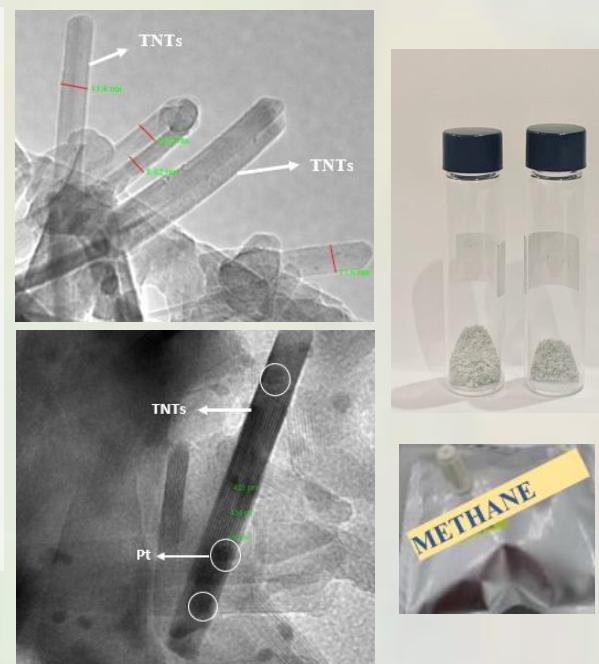
## PROBLEM



## INNOVATION



## PRODUCT

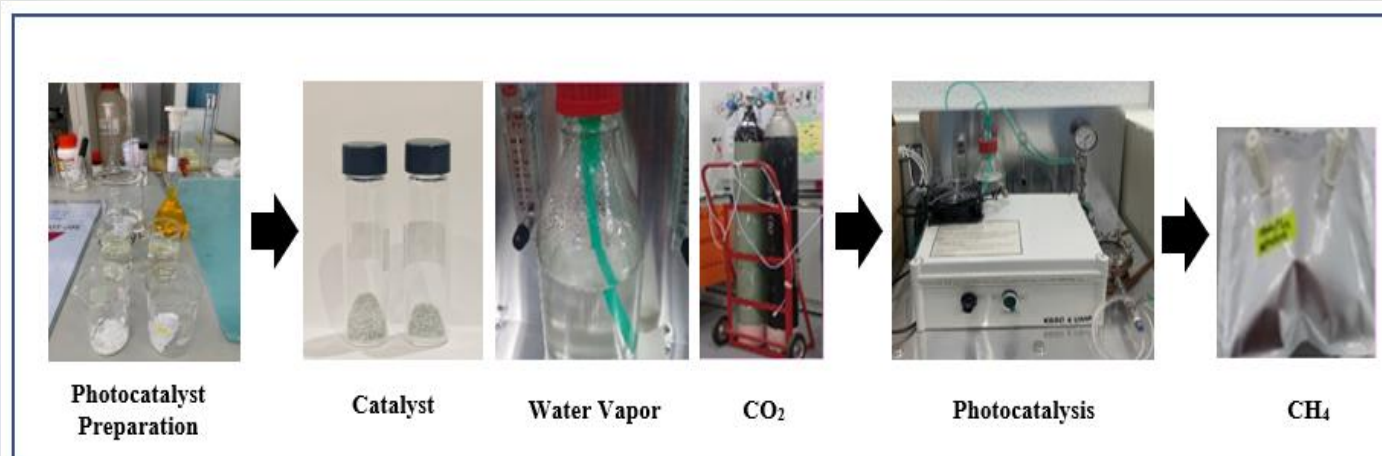


## RESEARCH OBJECTIVES

- To synthesize TNTs and Pt-TNTs for conversion of CO<sub>2</sub> to CH<sub>4</sub> under visible light spectrum.
- To characterize the physical properties and optical properties of synthesized photocatalyst.
- To evaluate the photocatalytic efficiency between Pt-TNTs and TNTs through the degradation of carbon dioxide.

## NOVELTY

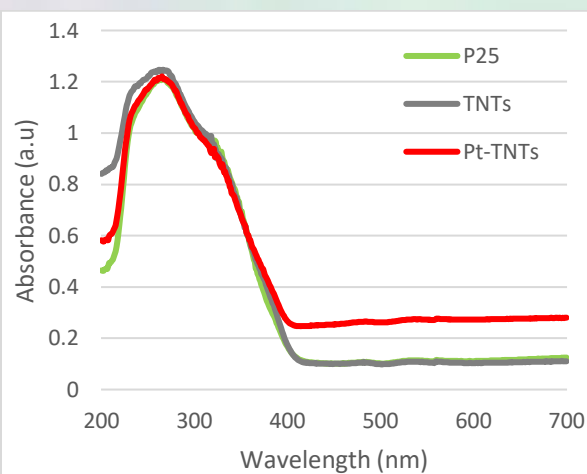
- Visible light active photocatalyst.
- Stable under different temperature and pressure.
- Easy to produce, lightweight.
- Used as a fuel for ovens, homes and for vehicles.
- Can used for electricity generation.



## ENVIRONMENTAL IMPACTS

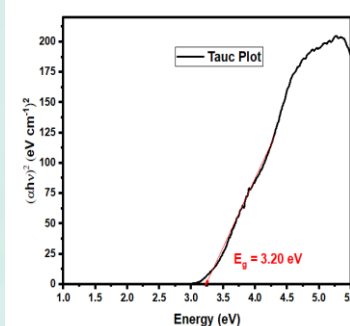
- The fruitful implication of the novel photocatalysts extended towards the gas phase photocatalytic conversion of CO<sub>2</sub> to light hydrocarbon
- A great enhancement performance for the reduction of GHG
- The light hydrocarbon CH<sub>4</sub> can be used as alternative source of energy
- This work signifies both energy and environment domains

## UV-VIS ABSORPTION SPECTRUM

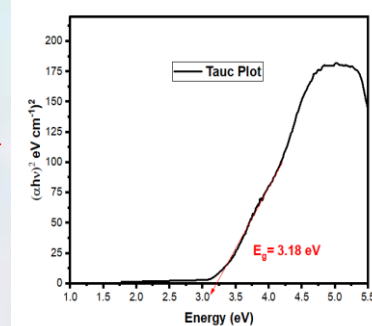


## BANDGAP ENERGY

TNTs photocatalyst (3.20 eV)



Pt-TNTs photocatalyst (3.18 eV)



## PUBLICATIONS

- Plasmonic Enhanced Au Decorated TiO<sub>2</sub> Nanotube Arrays as A Visible Light Active Catalyst Towards Photocatalytic CO<sub>2</sub> Conversion to CH<sub>4</sub>. Journal of Environmental Chemical Engineering, 7, (2019) 103233.
- Mechanistic Insights Into Plasmonic Photocatalysts In Utilizing Visible Light. Beilstein Journal of Nanotechnology, 9, (2018) 628.

## POTENTIAL MARKET



## AWARDS

- CITREX 2020 Glod Medal
- Citrex 2019 Certificate
- Cendekia BITARA 2018

## INDUSTRIAL COLLABORATION

- Kamaruddin Harun Consultants Sdn. Bhd