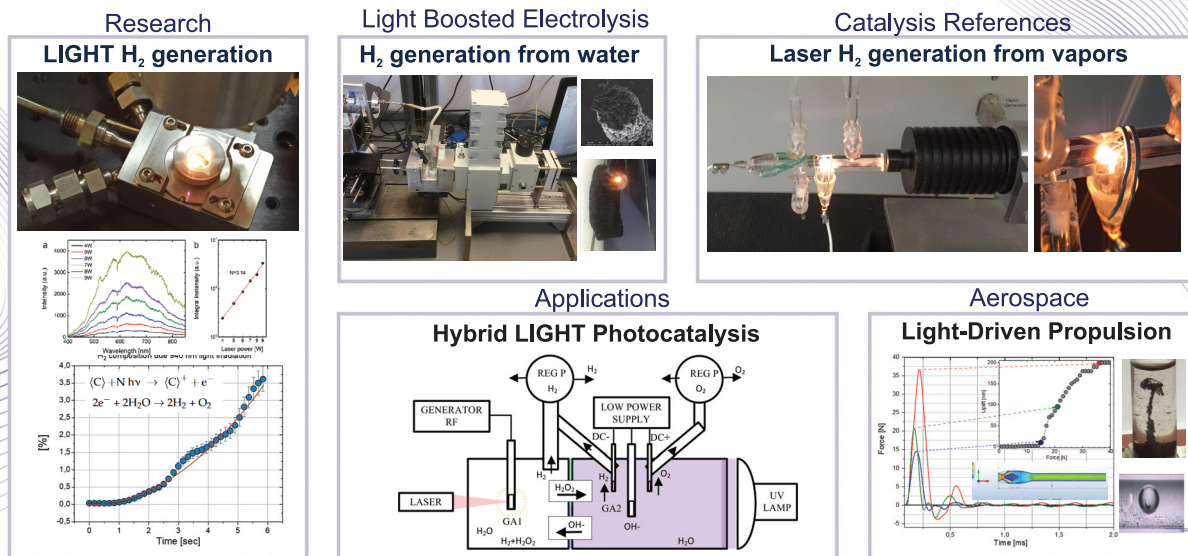


# Method and device for hydrogen generation

Generation of Hydrogen by laser irradiation of Graphene in alcohols, water and their vapors in scalable broadband photocatalytic reactor (UV-VIS-IR) for Renewable Energy Applications

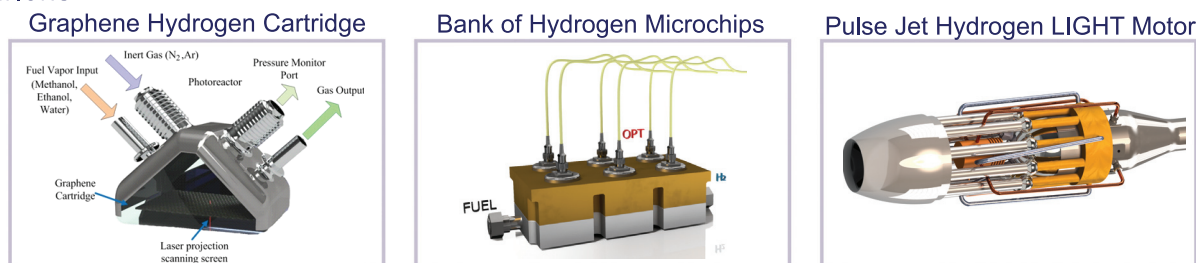
## INVENTION

The efficient generation of hydrogen occurred by using graphene as a photocatalyst. Invention demonstrated that Laser Induced White Emission (LIWE) on Graphene in water or other liquids (as source fuels) is applicable as a new method for hydrogen production. This emission resulted from the multiphoton ionization of graphene. The multiphoton ionization is assisted by the emission of hot electrons and precedes the broadband luminescence combined with the (sp<sup>2</sup>,sp<sup>3</sup>)→(sp<sup>3</sup>,sp<sup>2</sup>) hybrid transition [Stręk et al, Int. Journal of Hydrogen Energy 47, 63, 2022].



Hydrogen generation by light irradiation of graphene aerogel in water, ammonia water and methanol. Converting light energy into thermal energy using graphene-based photolysis with hydrogen storage. Photonic Devices Microchip for hydrogen distributed systems based on graphene nanocatalysts.

## INNOVATIONS



## ADVANTAGES

### The Graphene LIGHT Technology Main Advantages

1. Laser Induced Light on Graphene makes a high efficiency Synergetic Process for Hydrogen Evolution. Hydrogen Production Efficiency **~17kWh/kg H<sub>2</sub>**
2. Highest available hydrogen generation ratio using Photocatalysis electrode-less Graphene Hydrogen Removables Cartridges.
3. Photolysis directly from water using Graphene.
4. Cost-effective solution based on **CW laser** diodes array as energy sources.
5. Security issue - light source isolated from electrical power supply.
6. Mobile stand - small size of the LIGHT unit.
7. Patent application **UP P.436197**

The full list of currently research and approved patents is available on the website: [www.graphene-light-project.pl](http://www.graphene-light-project.pl)

## CONTACT



GRAPHENE LIGHT PROJECT SP. Z O.O.  
Address: Okólna str 2,  
Wrocław, 50-422, Poland

Contact: Prof. Wiesław Stręk  
[w.strek@intibs.pl](mailto:w.strek@intibs.pl)  
mob.: +48 695 097 542  
[www.intibs.pl](http://www.intibs.pl)

  
**Hydrogen Laboratory**  
[graphene4poland.pl](http://graphene4poland.pl)



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