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Inventors

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Fiber Optic Water PhotoCat Reduction

With the ever-expanding need for renewable energy sources growing, much time and energy is allocated to finding new and innovative technologies. Current membrane reactors focus on a specific class of photocatalyst or are limited to air purification only. This approach does not take into consideration a broader range of the electromagnetic spectrum, and often creates a narrow design in function.

ASU Researchers have developed an integrated reactor design for photocatalytic water splitting. This design at ASU has coated fiber optics and flexible polymeric membranes for enhanced adaptability. Researchers enhanced the ability of such a reactor by allowing it to function with the use of multiple light sources. This is accomplished through the utilization of immobilized photocatalysts, tuned to absorb the energy from the particular light source. The incorporation of hollow-fiber, spiral wound PEM elements allows for water splitting setups to be made into compact modules. Researchers at ASU have focused on inventing a system that is multifaceted. This new system has applications in both energy generation and water purification. Innovative in its design through the use of fiber optic cables coupled with Proton Exchange Membranes (PEM), this reactor system can cover a larger area of utility and purpose.

Potential Applications

- Water Splitting
- Dihydrogen (H₂) Production
- Water Purification

Benefits and Advantages

- Sustainable Dihydrogen Generator –
 - Creates dihydrogen (H₂) for energy production or industrial processing
 - Allows for fuel to be manufactured through both artificial and natural light sources
- Versatile Design – This reactor platform is unbiased towards a specific photocatalyst and is functional with any catalyst material used
- Flexible in Functionality – Contains tunable fiber optics that can be adjusted based upon the wavelength spectrum from a particular light source
- Space-Saving – The reactor system is compact in size, requiring very little horizontal surface area; allowing it to be placed in compact locations

For more information about the inventor(s) and their research, please see:

[Dr. Paul Westerhoff's directory webpage](#)

[Dr. Kiril Hristovski's directory webpage](#)

[Dr. Shahnawaz Sinha's directory webpage](#)

