Redefining the Landscape of Hydrogen Safety Using Innovative Gasochromic Technology

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The increasing focus on decarbonization has brought hydrogen into the center role in the quest for sustainable solutions. As the hydrogen economy is expected to grow, new detection methods are required to improve safety during storage and usage. The objective of this innovative project is to develop and validate a new cost-effective and reliable hydrogen sensor using gasochromic materials, aiming to address safety concerns associated with hydrogen's expanding role. The gasochromic technology is a simple method to detect hydrogen and has many advantages over traditional sensors. It is a chemical reaction that triggers a colour change in response to the exposure of hydrogen. It requires no power to operate, has a quick response time, and it is reliable. The materials used to assemble the sensor are non-hazardous and environmentally friendly. Here in this project, the gasochromic technology was utilized to validate a new hydrogen detection system. The sensor architecture consists of a WO3-Pd (Tungsten Oxide-Palladium) thin film, photodiodes, a microcontroller, along with a small resistive gas sensor for redundancy and early warning. The scope of work includes assembling the prototype, coding, testing, validating and performing experiments to collect raw data for measuring the response time. The outcome of this project is a new innovative, fully functional, reliable, and cost-effective hydrogen detection sensor, capable of responding within 30 seconds. The concept of this novel prototype sensor holds significant promise for utilization across a spectrum of hydrogen applications. Harnessing the capabilities of gasochromic technology could contribute to advancing the safety infrastructure required to grow the hydrogen economy as a means to reduce emissions.

Awards Won:

First Award of $5,000

Alfred University: Full tuition scholarship