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Development of a Real-Time Hydrogen Level Detection System for Storage Cylinders

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Abstract: *The development of a real-time hydrogen level detection system for storage cylinders is a crucial innovation aimed at enhancing safety, efficiency, and reliability in industries utilizing hydrogen as a fuel source. As hydrogen continues to gain prominence in applications like fuel cell vehicles and energy storage, ensuring the accurate monitoring of hydrogen levels within storage cylinders is vital. This system leverages advanced sensors to continuously measure and display key parameters, such as hydrogen concentration, pressure, and temperature, enabling real-time monitoring and quick response to any critical changes. By integrating this technology into existing systems, operators can proactively manage hydrogen storage, ensuring safe usage and optimized performance.*
Commercial applications usingcomplex metal hydrides are limited, especially for thermolysis-based systems where so far only demonstration projects have been performed. Hydrolysis-based systems find theirway in space, naval, military and defense applications due to their compatibility with proton exchange membrane (PEM) fuel cells. Tank design, modeling, and development for thermolysis and hydrolysis systems as well as commercial applications of hydrolysis systems are described in more detail in this review. For thermolysis, mostly sodium aluminum hydride containing tanks were developed, and only a few examples with nitrides, ammoniaborane and alane. For hydrolysis, sodium borohydride was the preferred material whereas ammonia borane found less popularity. Recycling of the sodium borohydride spent fuel remains an important part for their commercial viability..

Keywords: hydrogen storage; complex hydrides; modeling

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