Model establishment and process analysis of liquid hydrogen energy storage

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Under the general trend of energy reform and utilization of renewable energy, the role of hydrogen energy has been becoming increasingly prominent. The IHE report highlights hydrogen as an integral part of net zero emissions, and many countries are developing strategies to incorporate hydrogen into the major energy plans. Hydrogen is an ideal efficient clean energy, which can be used for fuel cells and other new energy sources. In addition, in the field of cryogenics and refrigeration, such as snow making, superconducting technology, high energy physics and other high-tech scientific devices, hydrogen is commonly used as a cryogenic working medium, but also as rocket propellant, and liquid phase can be used as coolant.

In the hydrogen energy storage status of production, storage, transportation, utilization, the cryogenic and refrigeration, the cryogenic has the advantages such as high density, low transportation cost, high purity of propellant and short filling time, which make it more suitable for the large-scale development of hydrogen energy. Liquid hydrogen can also be used as an energy storage medium for electric vehicles to improve the stability of the power grid and reduce the development of grid and load fluctuations in variable wind and solar power generation and reduce development of grid and load fluctuations in variable wind and solar power generation.

In this article, a model and analysis of energy storage process using liquid hydrogen at low temperature was established, including purification and liquefaction, liquid hydrogen storage, pressurized vaporization, cold energy utilization, power generation output and other processes, selecting appropriate methods and equipment, systematically analyzing all aspects of liquid hydrogen energy storage technology and energy generation efficiency, economy, environmental protection and economy, and comparing with other energy storage methods, such as thermal energy storage and electric energy storage. Their application scenarios and development trends were analyzed, seeking solutions on how to rationally and efficiently utilize liquid hydrogen energy storage and reduce units, so as to provide new ideas for the actual storage and application of hydrogen energy.

MODEL

CROCYGENIC

HYDROGEN

LIQUEFACTION

ENERGY STORAGE

C2Po2B-02

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