

CYCLIC METHOD AND EQUIPMENT FOR SOLID HYDROGEN-BASED HYDROGEN STORAGE AND TRANSPORTATION AT NORMAL TEMPERATURE AND PRESSURE

ABSTRACT

A cyclic method and equipment for solid hydrogen-based hydrogen storage and transportation at normal temperature and pressure are provided. The cyclic equipment includes a solid hydrogen cylinder, a hydrogen absorption module, and a hydrogen storage module. The solid hydrogen cylinder is made of stainless steel, and a magnesium ingot is placed in the solid hydrogen cylinder. The hydrogen absorption module and the hydrogen storage module are both of modular design structures, each including intelligent heating equipment. The intelligent heating equipment is configured to heat the solid hydrogen cylinder for hydrogen absorption or desorption. The intelligent heating equipment includes a human-machine interaction module, an intelligent control module, a power module, a heating module, a nano thermal insulation module, a temperature detection module, and a heat dissipation module. Based on optimal design of solid magnesium hydride in each link of hydrogen absorption, hydrogen desorption, hydrogen storage and hydrogen transportation, both the heating or heat dissipation of the solid hydrogen cylinder and space thermal insulation or heat dissipation can be achieved. Mass production can be achieved, and separate arrangement of the heating module and the heat dissipation module can achieve rapid cooling and heating.

(Fig. 1)