친환경차량

수소전기차의 안전한 충전을 위한 수소충전소 평가기술 개발

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Development of Hydrogen Station Assessment Technique for Safe Refueling of Hydrogen Fuel Cell Electric Vehicle

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Key Words : Hydrogen fuel cell electric vehicle(수소연료전지자동차) Hydrogen refueling station(수소충전소), Fueling protocol(충전 프로토콜), Safety function(안전기능), Emergency shutdown(긴급차단), Hydrogen station performance assessment system(수소충전소 성능평가 장치)

ABSTRACT

The hydrogen supply maximum pressure is 87.5MPa to charge a hydrogen fuel cell electric vehicle at hydrogen refueling station. SAE(Society of Automotive Engineers) developed J2601(Fueling Protocols for Light Duty Gaseous Hydrogen Surface Vehicles) to quickly charge hydrogen to Fuel Cell Electric Vehicle (FCEV). SAE J2601 establishes the boundary conditions for safe hydrogen surface vehicle fueling, such as safety limits and performance requirements for gaseous hydrogen fuel dispensers used to FCEV. Also, SAE J2601 establishes the protocol and process limits for hydrogen fueling of vehicles with total volume capacities greater than or equal to 49.7L. These safety and process limits (including the fuel delivery temperature, the maximum fuel flow rate, the rate of pressure increase, and the ending pressure) are affected by factors such as ambient temperature, fuel delivery temperature, and initial pressure in the vehicle's compressed hydrogen storage system.

Korea Gas Safety corporation developed Hy-PAS(Hydrogen station Performance Assessment System) for fueling Safety accordance with SAE J2601. In this paper, we will introduce the evaluation device (Hy-PAS) and method for safety function in hydrogen refueling stations.

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데이터 분석 기반의 배터리 건강상태 예측 모형 개발

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Development of Battery Health Status Prediction Model Based on Data Analysis

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Key Words : Battery(배터리), State of health(건강상태), Big data(빅데이터), Data analysis(데이터분석), Artificial Intelligence(인공지능), Deep learning(딥러닝)

ABSTRACT

Predicting the deterioration state and lifespan of the battery is the most important factor in the development of electric vehicles. There is a non-linearity in battery deterioration. We conducted research on developing a model to predict battery state of health(SOH) and lifespan through artificial intelligence technology. A prediction model was developed through deep learning-based networks such as Convolutional Neural Network (CNN) and Recurrent Neural Network (RNN).

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전기차 배터리 셀의 품질관리를 위한 인공지능 기법

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Artificial Intelligence Techniques for Quality Control of EV Battery Cells

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Key Words : Battery(배터리), AI(인공지능), Ohmic(전해질상태), Charge Transfer(전극상태)

ABSTRACT

Electric vehicle fires are recognized as the biggest obstacle to market expansion, thus control of battery cells is recognized as very important. This research team developed a solution to measure the internal resistance of battery cells as quickly as possible during the manufacturing stage using artificial intelligence techniques. According to the results of our analysis, it was confirmed that the condition of the electrolyte and electrodes did not meet the quality control level required by the vehicle OEM.

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전기차 하부 충돌로 인한 화재 위험성

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Fire Risk Due to Collision Under EV Battery

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Key Words : EV(전기차), lithium-ion battery(리튬이온배터리), EV collision(전기차 충돌), Battery collision(배터리 충돌), EV safety전기차 안전성)

ABSTRACT

As the spread of eco-friendly vehicles increases worldwide, the number of electric vehicles that do not emit harmful exhaust gases is increasing. According to IEA, Global Electric Vehicle Outlook 2022, global automobile sales in 2021 were 84.55 million units, a 9.7% decrease compared to pre-COVID-19 (2019), but electric vehicle sales increased 226.3% compared to 2019, reaching an all-time high of 6.6 million units. According to data released by the Korea Automobile Safety Research Institute, an analysis of 9 fire accidents after electric vehicle collisions since 2018 showed that 6 fires were caused by high-speed frontal collisions, and 3 were confirmed to be caused by collisions under the electric vehicle. High-speed collisions can also occur with internal combustion engines, but there have been cases of accidents caused by lower-end collisions even at low speeds of 15 km/h or less, showing that they pose a different risk from internal combustion engine vehicles. We were also able to confirm a case where Tesla, an overseas electric vehicle company, took additional measures to prevent damage to the battery due to a collision at the bottom. It appears that various studies will be needed in Korea to improve safety in the event of a collision under the battery of an electric vehicle. A variety of tests and research are needed to establish standards for evaluating the crash safety of electric vehicle lower batteries through various studies and to strengthen safety against lower electric vehicle crashes.

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