

Hyundai's FCEV: A Pathway to the New Possibilities

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Due to the energy and environment issues, polymer electrolyte membrane fuel cell (PEMFC) power systems are currently being actively studied for use in passenger cars and fleet vehicles. Compared to other types of fuel cells, PEMFCs are known to possess high current density, and the stack structure is rather simple. Furthermore, as the electrolyte material is in solid state at all times, there is no leakage or loss of electrolytes during operation. PEMFC has other advantages such as rapid start-up and response, long endurance, and flexibility of fuel usage from pure hydrogen to methanol and natural gas. Among the core components of a PEMFC system are the electrolytes, the electrodes, and the bipolar plates. Other parts to significantly affect the fuel cell performance are the sub-systems for i) thermal and water management, ii) hydrogen supply and recirculation, and iii) air supply. These three core sub-systems are typically known as 'balance of plant (BOP)', and they compose a crucial portion in any fuel cell power plant. Recently, fleet fuel cell vehicles of the major automakers, particularly such as Daimler, Toyota and Honda, are seen in numbers in North America, in cities throughout Europe, and in Japan. By their efforts to develop fuel cell vehicles, the fuel cell market is expected to introduce fuel cell vehicles in thousands per manufacturer after 2015 and over 10,000 units in around 2020. In Korea, Hyundai Motor Group (HMG) has accelerated fuel cell researches with the aid of government funded programs since 2003. HMG has also been developing several types of fuel cell SUVs and buses, and so far has been operating over 300 vehicles worldwide with accumulating mileage of over 4 million kilometers. In February, 2013, for the first time in the world, HMG started small scale mass production of ix 35 Tuscon FCEV. In this presentation, overall aspects of HMG's fuel cell researches are introduced along with the development history and the future roadmap, emphasizing the recent events in European fuel cell communities.