## 2<sup>nd</sup> International Conference on

## **Battery and Fuel Cell Technology**

July 27-28, 2017 | Rome, Italy

## Theories of on-board hydrogen redox electric power generators for infinite cruising range electric vehicles

**Katsutoshi Ono** Kyoto University, Japan

This paper presents the theoretical aspects of a specific propulsion system for electric vehicles, based on a prototype standard passenger fuel cell vehicle (FCV), termed a hydrogen redox electric power generator (HREG). This generator utilizes a combined energy cycle composed of a fuel cell that produces power and an electrostatic- induction potential superposed water electrolytic cell (ESI-PSE) for the synthesis of a stoichiometric  $H_2/O_2$  fuel for the fuel cell. To allow an essentially infinite cruising range, the fuel must be synthesized while the car is in motion. In this scenario, the HREG offers considerable advantages. Firstly, this device is capable of functioning with zero matter and energy inputs and generates no emissions, without violating the laws of thermodynamics. The  $H_2O \rightarrow H_2 + 1/2O_2$  reduction reaction proceeds in the ESI-PSE, which functions on a so-called "zero power input" mechanism involving the conversion of electrostatic energy to chemical energy. In this unit, the power used is 17% of the total electrical energy that is theoretically required, while the remaining 83% can be provided by electrostatic energy free of power. Part of the power delivered by the fuel cell is returned to the ESI-PSE cell, while the remainder represents the net power output used to drive the electric motor. A second advantage is that the HREG system can be employed on both a large scale, such as in the case of a central power station, and on a much smaller scale, such as for on-board electric power generation in an electric vehicle. The present work performed a theoretical assessment of this new propulsion system for electric power generation in an electric vehicle. The present work performed a theoretical assessment of this new propulsion system for electric vehicles, focusing on the following three aspects:

- 1. The power electronics circuit connected to the ESI-PSE cell
- 2. The performance of the on-board HREG system
- 3. The lithium-ion battery charge-discharge reciprocating electric power generator



## Biography

Katsutoshi Ono received B. Eng. Degree from Kyoto University, Japan, in 1961, degree of Dr. Sci. from Faculté des Sciences, Université de Paris in 1967. He was researcher at Ecole des Mines de Paris, 1965-1967, Professor of Materials Science, Kyoto University, 1982-1997, Energy Science & Technology, 1997-2001. He is Currently Professor Emeritus.

ono6725@tg8.so-net.ne.jp