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Katsutoshi Ono

Kyoto University, Japan

Theories on the on-board lithium-ion battery electric power generator for infinite cruising range vehicle

The On-board electric power generation in the absence of external energy may be sufficient to realize tough electric vehicles. The method to charge the Li-ion battery modules in the present investigation differs from the conventional single voltage source scheme in that the power requirement is only 12% of the power required for typical direct voltage applications. This method utilizes the electrostatic-induction potential-superposed electrolytic charge (ESI-PSC). The on-board electric power generation system is an identical twin of battery modules that function in ESI-PSC mode, in which the performance can be explained through consecutive cycles of field-induced charge and discharge between two batteries (Fig.1). When the charge of one battery is terminated, it becomes responsible for both the power to recharge the other battery and the power to drive the motor. This power generation system works with zero energy input, zero matter input and zero emission, without violating the laws of thermodynamics. The commercially available Li-ion battery modules and power control systems enable the realization of this type of EVs. A simulation based on the official standard cruising mode (JCO08) showed that an electric vehicle with an on-board twin of 13.2 kWh energy capacity modules can travel 132 km before switching from charge to discharge.

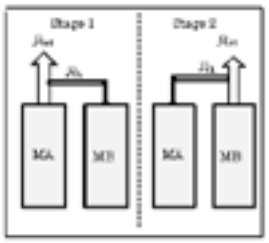

Fig.1 : Li battery charge-discharge reciprocating electric power generation system. Pnet: net power output; Pch: charge power, MA: Module A; MB: Module B.

Recent Publications

1. Ono K (2012) Principles of Energy-Storage Capacitive Power Generator in an Electrostatic-Induction Electromechanical Coupling System. IEEJ 132 997-1004.
2. Ono K (2015) Theoretical Concept of Hydrogen Redox Electric Power Generation, IEEJ 135 456-466.
3. Ono K (2015) Energetically Self-Sustaining Electric Power Generation System Based on the Combined Cycle of Electrostatic –Induction Hydrogen Electrolyzer and Fuel Cell 135 22-33.
4. Ono K (2016) Hydrogen Redox Electric Power and Hydrogen Energy Generators. International Journal of Hydrogen Energy. 41 10284-10291.

Biography

Katsutoshi Ono, born in 1937 in Tokyo. He received his B. Eng. Degree from Kyoto University, Japan, in 1961 and the degree of Dr. Sci. from Faculté des Sciences, Université de Paris in 1967. He was researcher at Ecole des Mines de Paris, 1965-1967. He was Professor of Materials Science, Kyoto University, 1982-1997 and a Professor of Energy Science & Technology, Kyoto University, 1997-2001. He is currently Professor Emeritus.

ono6725@tg8.so-net.ne.jp