

Aug. 2018

RECENT

PROJECT

Development of Electric Vehicles with Body-Integrated Super-Capacitor Energy Storage System

Funding source: Innovation and Technology Fund

Funding amount: \$4.2 Million



Project News

We have recently completed the project for the next generation of electric vehicle. The project is to investigate and develop the super-capacitor (SC) energy storage system integrated with EV's body. It improves performances of the battery energy storage system and the hybrid battery-capacitor energy storage system, such as instantly supplying high power to EV's motor and instantly absorbing high feedback power, improving system efficiency, quicker charge, more safety and minimum space. The development of the project includes the system structure that consists of the super-capacitor and battery energy storage system, the super-capacitor and battery management system, the vehicular control unit and motor drive system, the integration of the super-capacitor energy storage system with the vehicular body, integration of the above whole electrical system in a light EV prototype.

We have recently an award from FITMI Hong Kong innovative Technology Achievement 2017.



•Technologies and Features of the Research Development:

- Body-integrated super-capacitor (BISC) package
- Super-capacitor management system (SCMS) and battery management system (BMS)
- Monitor, manage, and maintain SC and battery operation, provide the warning indications to any faults, and protect safe operation of BISC and battery
- Topology structure of electric system in EV
- Model and simulation of EV system including SC, battery, motor drive, and car
- Energy control strategy of hybrid energy system
- Applicable to electric vehicles

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IN PROGRESS

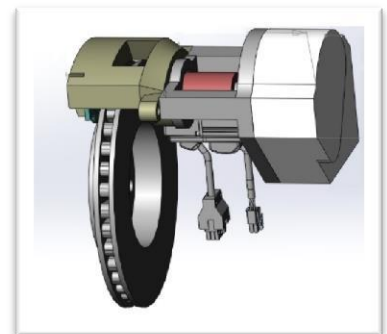
The Development and Application of All Electric Intelligent Anti-lock Braking System for Electric Vehicles

PROJECT

Funding source: Innovation and Technology Fund

Funding amount: \$2.2 Million

Project News



We have recently awarded with a new project form Innovative and Technology Fund. The project is to develop the next generation of anti-lock braking systems (ABS) for vehicles using all electric drive method. In the past, the ABS is mainly using mechanical based with hydraulic systems that has not been improved for last many years. The new proposed method is using all power electronics based.

•Technologies and Features of the Research Development:

- Electromagnetic disk brake
- All electric anti-lock braking system (ABS)
- Intelligent ABS control
- No pedal vibration in ABS operation
- Individual adjustable pedal module
- No flammable fluids
- Simplification of braking equipment, reduction of complexity and quantity of components
- Applicable to electric vehicles or conventional ICE vehicles

CONTACT US FOR MORE DETAILS

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Jan. 2021

PESA Conference 2020 successfully organized

The International Conference on Power Electronics and Systems Applications (PESA) 2020, technically sponsored by TEC, has been successfully organized and held in Hong Kong on 7-11 December. This four-day conference focuses on recent research and industrial projects concerning power electronics and related technology, with focuses on Future Mobility and Future Power Transfer. The conference aims to be a key international forum for the exchange and dissemination of technical information on power electronics among academics and practicing engineers in the field.

The conference consists of tutorials, keynote speeches, oral paper presentations, and a student competition organized with TEC. Ten tutorials are delivered by renowned speakers in power electronics and electric mobility, along with seven keynote speeches from experts in the field. The Student Competition on Electric Transportation Design – Automotive, Vessel, and Aircraft was organized on the second day of the conference and the winners were announced on the third day. The 1st prize will be awarded \$2,500. The second and third prizes received \$500 and \$100 respectively.

A total of 105 papers have been accepted for the conference. The participants came from the United Kingdom, Spain, China, Hong Kong, India, New Zealand, and Australia. Accepted papers will be published in IEEE Xplore.

Student Competition Winners

- 1st Kaiwen CHEN, PolyU**
- 2nd Anna CHANG, Loughborough U**
- 3rd Kin Lung Jerry KAN, PolyU**

Best Paper Awards

- Gold: Yong Ji, Guangdong U of Tech**
- Silver: Xiangdang Xue, Shisong Wang**
- Bronze: Yajie Jiang, Shaoliang Zhou, Zhaowei Zhang**

IN

PROGRESS PROJECT Ammonia-Powered Fuel-Cell Electric Vehicle in Hong Kong

Funding source: Innovation and Technology Fund
Funding amount: HK\$9.9976 Million

Project News

We have recently awarded with a new project from Innovative and Technology Fund. The development of the project includes the hybrid energy storage system consisting of the ammonia-powered fuel cell, the Li-ion battery and the super-capacitor, the power conditioning system for the ammonia-powered fuel cell, the energy control technology for improving system efficiency, and the mini-ebus prototype with the total drive range of 500 km. A hydrogen-powered EV has disadvantages of high cost of hydrogen storage and risk of explosion. In this project, hydrogen is produced from ammonia on the vehicle for feeding fuel cells. A large storage of hydrogen is not needed as the hydrogen is consumed immediately. There are no hazardous issues from the hydrogen. Non-explosive ammonia is a zero-emission fuel.

•Technologies and Features of the Research Development:

- Ammonia (NH₃) cracking technology for fuel cell
- Catalyst optimization
- Ammonia-powered light vehicle
- Energy optimization
- Applicable to long range electric vehicles
- Zero emission (no carbon)
- Comparison with hydrogen fuel:

- Hydrogen needs 700 bars storage whereas Ammonia only needs 8 bars
- Easier to handle and safer
- More suitable for future refill, operation in gas station and storage in EV
- Much faster in refilling the tank than charging the battery
- 22.7 kg Ammonia produces 55.6 kWh, i.e. 1.2 kWh/kg, whereas battery is 0.2 kWh/kg
- Ammonia is wide available
- Extended driving range

