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STRUCTURAL BATTERIES AND MULTIFUNCTIONAL CARBON COMPOSITE MATERIALS

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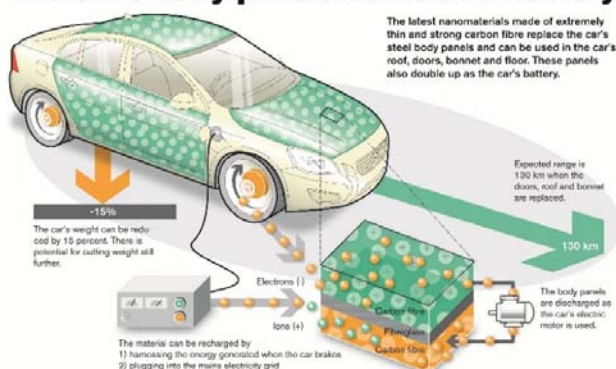
日時: 7月11日(月) 16:00~17:00

場所: 東京大学工学部3号館4階423号室

The need to develop greener, safer and more competitive road transport has been recognized as of critical societal and commercial importance. Electrification approaches to urban mobility and transport is one of the most urgent research areas as recognised by many international organisations. In addition, the need for advanced lightweight materials to realise future lightweight electric vehicle solutions is also identified. The research presented on structural batteries is set out to address both these; lightweight multifunctional materials that simultaneously can store electrical energy and carry high mechanical loads.

In brief, by adopting a multidisciplinary approach, a novel Li-ion battery material is developed employing commercial grades of carbon fibres as combined electrode and reinforcing elements and solid polymer electrolytes as the matrix for simultaneous Li-ion transport and transfer of mechanical loads. The materials developed are expected to significantly reduce vehicle system weight and allow electrical energy storage in the structural load path of electrical vehicles in, for example body-in-white.

The car's body panels serve as a battery



In this work we have also found that one can functionalise carbon fibres by using them as an electrochemical electrode. The functionalization using lithium ion intercalation reveals three novel and interesting possibilities enabling carbon fibres composites to obtain several other multifunctionalities. These are strain sensing, actuation and energy harvesting. All of these functionalities can be combined with structural load bearing and energy storage.

主催: 東京大学大学院工学系研究科「機械システム・イノベーション」プログラム (GMSI)
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