

# Structural battery composites

Leif Asp, Department of Industrial and Materials Science

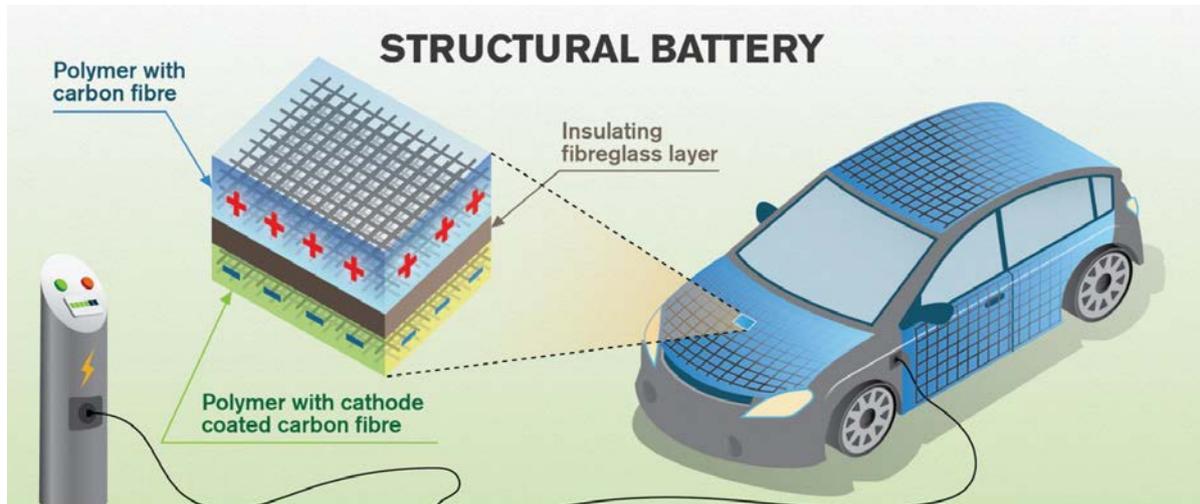


Fig. 1: Future electric vehicle using structural battery composites from multifunctional carbon fibres.

**What is it?** Using carbon fibre, scientists at Sweden's Chalmers University of Technology have found a way to store electricity in the body of a vehicle.

**Why does it matter?** "Structural batteries" hold the promise of vehicle bodies that don't serve just a structural purpose, for instance, but can be used as reservoirs for the energy powering the vehicle. This could lead to reduction in overall weight and greater electrification and open the door to possibilities such as electric aircraft. A car body would then be not simply a load-bearing element, but also act as a battery. It will also be possible to use the carbon fibre for other purposes such as harvesting kinetic energy, for sensors or for conductors of both energy and data. If all these functions were part of a car or aircraft body, this could reduce the weight by up to 50 percent.

**How does it work?** We investigated the carbon microstructures of several commercially available carbon fibers, some with good electrochemical properties but less stiff, and some firmer options but with less electrochemical usefulness. Armed with knowledge how the carbonaceous structure and crystal size affect the electrochemical performance of carbon fibres we can develop improved multifunctional composites.

**Publication** Fredi G, Jeschke S, Boulaoued A, Wallenstein J, Rashidi M, Liu F, Harnden R, Zenkert D, Hagberg J, Lindbergh G, Johansson P, Stievano L, Asp LE. *Graphitic microstructure and performance of carbon fibre Li-ion battery electrodes*. **Multifunctional Materials** 1, 2018, 015003. (Appointed among the **top-ten breakthroughs in physics in 2018** by Physics World).

**Patent** Zenkert D, Asp L, Linde P. *Structural component with an electrical transmission device, method for providing a structural component with an electrical transmission device, electrical wiring system and aircraft component*. Patent Application in European Procedure, Application no. 16180004-0. Application date: 18.07.2016. (US patent application No. US15644000, 07.07.2017. Publication No. US20180015995A1. Publication date: 01.18.2018). (Airframe innovation Patent Day Winner 2016, Airbus Patent day, March 30<sup>th</sup>, 2017, Toulouse, France)

### Media coverage

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