

Project abstract

Title: Development of a Nano-Plasmonic Fiber Optic Sensing Platform for Battery Monitoring

Objective

To design, develop, and evaluate a low-cost, robust and efficient sensor system based on a fiber optic probe and nanoplasmonic sensing.

Abstract

The need for sustainable and cost-efficient ways of storing energy has increased rapidly with the transition from fossil to renewable energy sources. Especially, the car industry is undergoing a rapid transformation to hybrid and fully electrically powered vehicles. The cost and performance of Lithium Ion Batteries (LIBs) is a major hurdle, in no small part due to the sensitivity of the LIB chemistry and the required safety margins of such batteries. LIBs are therefore generally over dimensioned and used within a lower operational range than what would be possible. Insplorion has developed a sensor technology that enables monitoring of the local chemical- and temperature changes inside batteries, which makes it possible to exploit the capacity of LIBs to a fuller extent. The market potential of this sensor has been thoroughly investigated in collaboration with industrial partners from a range of sectors.

The technical usefulness of Insplorion's NPS battery sensor is verified but the present development platform for the optical signal read-out is both too costly and bulky, for the end-application. Through a previously performed feasibility study, a suggestion of various optical configurations that could meet the requirements were identified. In this project, the most promising of these will be thoroughly evaluated.

When successful, this project will greatly advance the productization of a commercial NPS sensor for battery monitoring. The novel solutions to optical sensing with fiber probes designed within this project will also advance the expertise at RISE and Insplorion, and could contribute to establishing Sweden as a key provider of advanced energy storage solutions, and sensor systems.

Co-ordinator: Insplorion

Project manager: Elin Langhammer

E-mail project manager: elin.langhammer@insplorion.com

Phone: +46703948104

Other project partners: RISE Acreo

Total cost of project: 3 402 400 kronor

Total grant: 1 660 000 kronor

With support from:



STRATEGIC
INNOVATION
PROGRAMMES