

## A method of preparing a cathode material for a lithium-sulphur battery

### Development status

#### Phase 1

**Basic research.** A pure research based on the already observed and published facts.

### IP protection status

Patent CZ 308296

### Partnering strategy

*Collaboration, licensing*

### Institution



**Tomas Bata University in Zlín**

### Challenge

Lithium-sulfur (Li-S) batteries are a type of rechargeable battery that they use lithium as the positive electrode (cathode) and sulfur as the negative electrode (anode). These batteries have gained considerable attention in recent years due to their potential for high energy density and cost-effectiveness compared to traditional lithium-ion batteries. Our solution concerns the optimization of the cathode material with the aim of increasing its electrochemical performance and the associated increase in the lifetime of the Li-S battery.

### Description

The optimized cathode material consists of a nitrogen-doped mesoporous carbon support structure with sulfur-filled pores. The essence of the new method of preparation of this optimized material is the use of chitosan biopolymer as a carbon precursor, with the fact that it also serves as a source of nitrogen for simultaneous doping of the carbon structure. Nitrogen doping then leads to the formation of a strong bond between the carbon and sulfur functional groups and also to an increase in the adsorption of polysulfide lithium intermediates, which improves the electrochemical performance of the cathode and increases the lifetime of the Li-S battery.

### Commercial opportunity

A new highly efficient method of preparing an optimized cathode material is intended for use by manufacturers of Li-S batteries and their components.