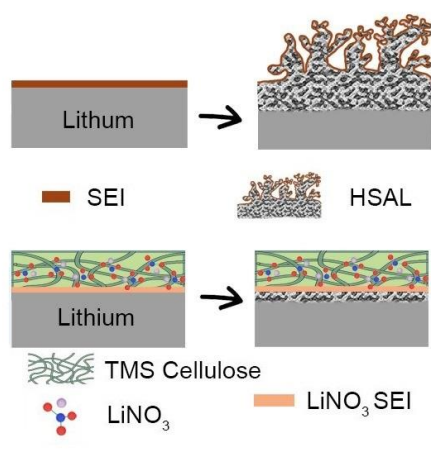


## SILYLATED CELLULOSE BASED INTERFACIAL PROTECTIVE LAYER ON A LITHIUM SURFACE



Formation of lithium dendrites of unprotected lithium (upper) in comparison with TMSC protected lithium (lower).

Lithium metal batteries are among the most promising candidates for next-generation high-density energy storage devices due to unrivalled high specific capacity and the lowest reduction potential of lithium metal anode. Estimations are that the global market will grow with a CAGR of 17% and reach the value of USD 100bn by 2025. This growth also depends on solving some of the current challenges. The usage of the lithium metal anode is obstructed by at least three issues; dendritic deposition of lithium during charge, lithium extreme interfacial instability in liquid organic or polymer electrolytes, and large volume expansion of lithium anode during cell operation. Our invention provides a lithium metal anode protective layer, and methods for their fabrication. The protective layer is capable of protecting common anode materials like lithium and lithium alloys from destructive reactions with other battery components.

### TYPE OF COOPERATION

Technology licensing opportunities,  
R&D collaboration

### INTELLECTUAL PROPERTY

EP3591743 (A1)  
WO2020007981 (A1)

### DEVELOPED BY

Department of Materials Chemistry

### CONTACT

Knowledge Transfer Office  
P: 00386 1 4760 529  
E: knowledge.transfer@ki.si

### MORE INFORMATION ABOUT THE INVENTION



### Technology

The Institute's invention is an artificial protective layer that is comprised of silylated cellulose, optionally including ion conductive additive(s) and methods for their fabrication. This approach enables the protection of lithium metal with environmentally-friendly cellulose and the use of simple production methods applicable on an industrial scale.

### Main advantages

- Use of environmentally-friendly and abundant cellulose
- Easy control of the properties of prepared membranes
- Use of simple production methods applicable on an industrial scale
- Affordable manufacturing process

### Key words

Batteries, Electrochemical cells, Electrodes, Anodes, Silylated Cellulose