Highly conductive, graphite-based bipolar electrode unit for redox flow batteries

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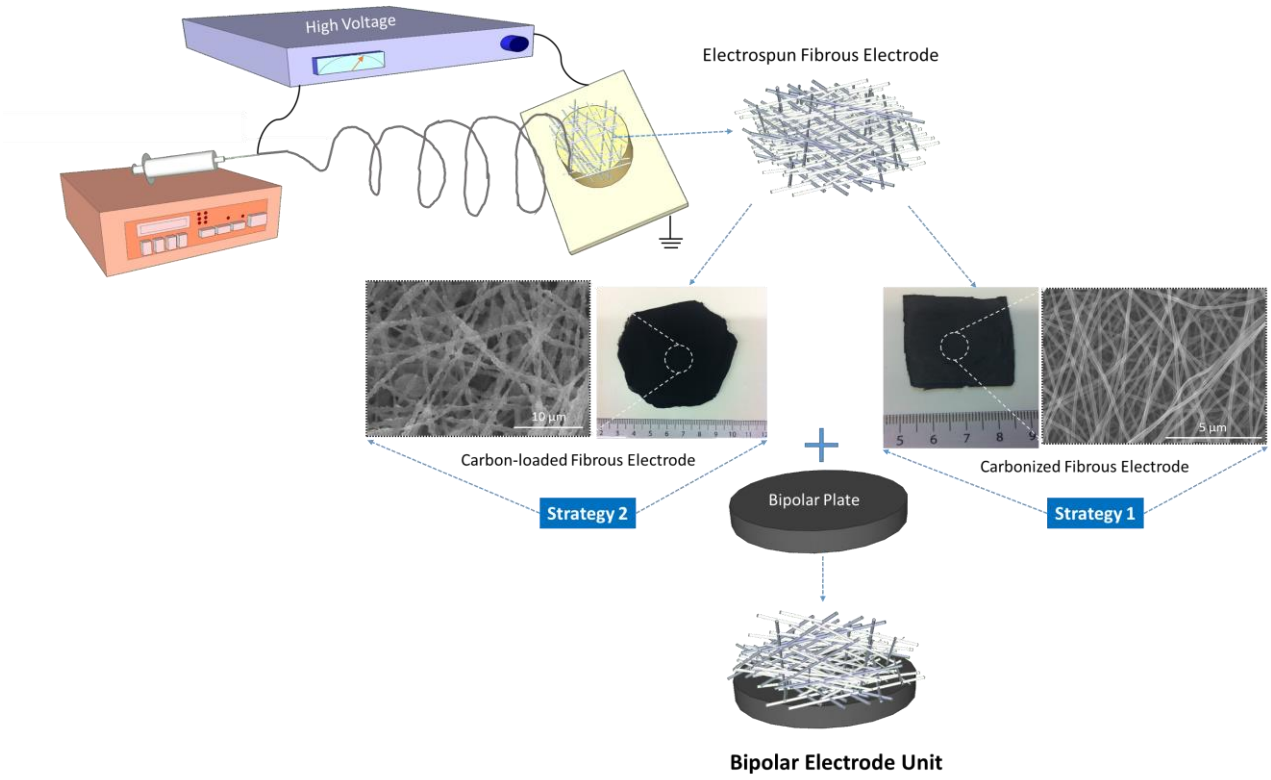
Project Summary

The Redox Flow Battery (RFB) technology is a technology that will become available on the market in the near future for large storage capacities, such as those needed as part of Germany energy transition in the future. Nevertheless, there is still a need for the significant cost reduction in this technology, in order to enable economic application in the long term for the large number of technically meaningful application areas. The highest, technological cost reduction potential lies in the stack construction or material costs.

The present project is pursuing two relevant approaches: Firstly, the provision of higher performance with the same stack size due to reduced internal resistance; and secondly, a simplified assembling by prefabricated so-called bipolar electrodes, which reduces the number of necessary components per cell from about 4-6 to only 2.

The aim of my work (HiCo-BiPEC project) is the flexible production of novel electrode mats with a significantly increased surface area compared to commercial felts. This allows intensive contacts between the electrolyte and the arrester. For this purpose, two fabrication strategies will be considered:

Strategy 1: Preparation of electrospun fibrous electrodes and optimization of their subsequent carbonization;
Strategy 2: Preparation of electrospun fibers filled with carbon black without subsequent carbonization step and optimization of the degree of carbon loading.



Schematic of the manufacturing process of bipolar electrode unit