

tubulAir± Tubular Redox-flow Battery

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 Funded by: BMBF
 Period: 01.09.2012 - 31.08.2017

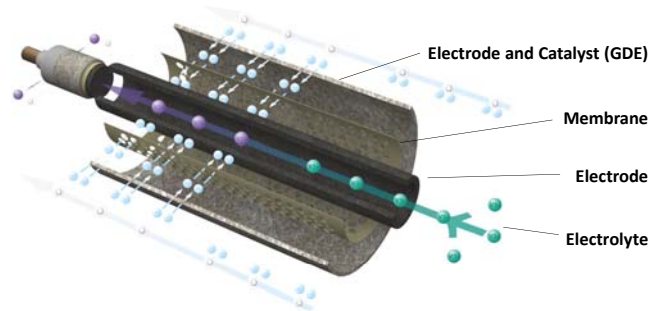


Tubular Vanadium Air Redox-flow battery

Main target of the joint project is the development of key technologies for the cost-effective manufacturing of a micro tubular Redox-flow battery with increased energy and power density for stationary appliances.

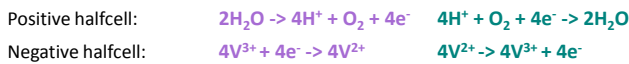
The planar All Vanadium Redox-flow battery (VRB) is suitable for this purpose. The comparatively low energy density (max. 37.5 Wh/kg) of the VRB as well as the cost intensive manufacturing of planar cell stacks require significant improvements for a broad market entrance.

To achieve higher energy density, the fluid electrolyte of the VRB on the cathode shall be replaced by an air/water steam electrode (GDE). For a better cost effectiveness, a micro tubular cell structure will be developed.



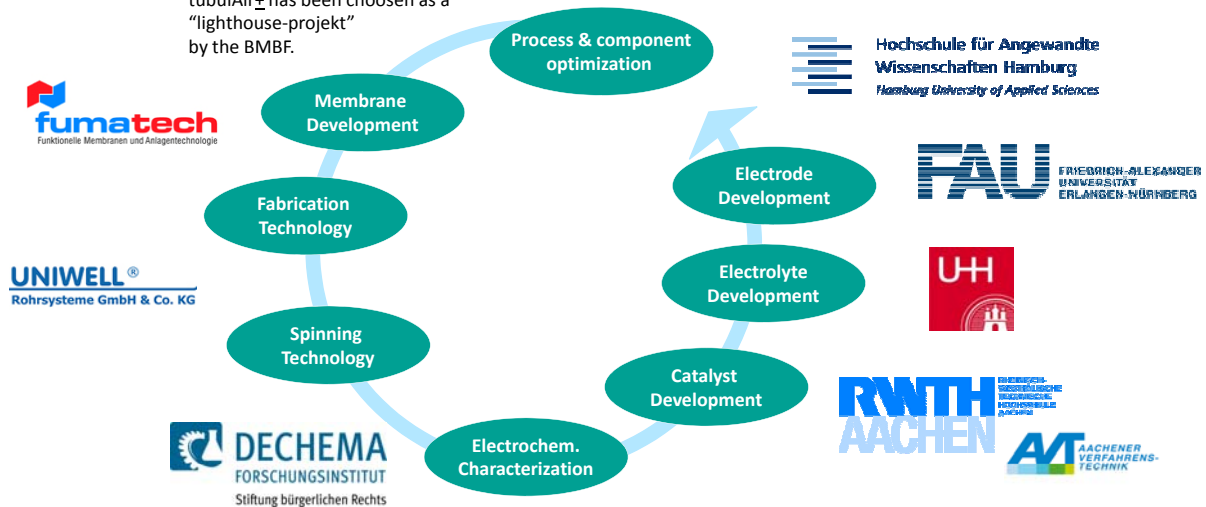
Scheme of the tubular Vanadium Air Redox-flow battery

Redoxreactions during charging and discharging



Partners of the joint project

A heterogenous group of universities, institutes and companies provides a unique congregation of basic research to manufacturing experience. tubulAir± has been chosen as a "lighthouse-projekt" by the BMBF.



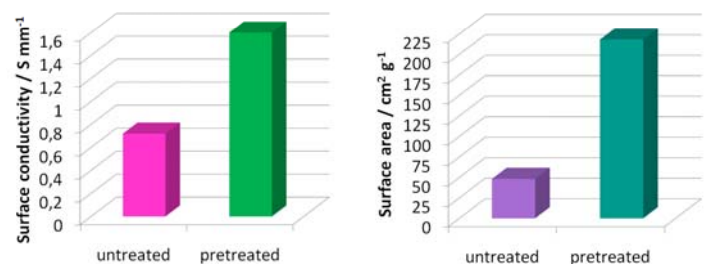
Testing of components and system

The electrochemistry working group at the DFI functions as connective link between manufacturers of the single components and developers of the Redox-flow system.



- Development of a catalog of quality requirements for components of redox-flow batteries as:
 - Electrodes
 - Catalyst
 - Membrane
 - Electrolytes
- quality assurance with electrochemical methods especially investigations for
 - Material tolerance and longevity
 - Corrosion phenomena

Testing of single components of the tubular Vanadium Air Redox-flow battery, e.g. electrode Material:



Four-point-resistivity-measurements show that the conductivity of the electrode material can be doubled by heat pretreatment. The surface area of the pretreated material is even four times higher than of the untreated material. Surface area measured and calculated by the BET (Brunauer-Emmett-Teller)-method.