

Solar Hydrogen for Antarctica: Water Splitting under Extreme Conditions

Initiative: "Experiment!" (beendet)

Ausschreibung: Explorative Phase

Bewilligung: 27.11.2018

Laufzeit: 1 Jahre 6 Monate

Projekt-Website: <https://www.uni-ulm.de/specsy>

The energy supply of most high-latitude research stations is based on fossil fuels. In remote and sensitive environments this poses particular problems like potential contamination by spilling events, expensive logistics associated with the transport, and not to forget global warming caused by carbon dioxide emissions. The supply with renewables is very challenging due to the extreme environmental conditions. The proposers want to explore solar hydrogen generation under high pressure and the low temperatures typical for Antarctica or Greenland. These are the conditions, under which an autonomous fuel generator would harvest ice and snow as starting material to generate hydrogen that can then be stored in high-pressure gas bottles. It is currently unclear, under which operating conditions efficient hydrogen generation is still possible, what the influence of (concentrated) light is, and what impact freezing point-depressing electrolytes suitable for low temperatures have in this context.

Projektbeteiligte

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Efficiency gains for thermally coupled solar hydrogen production in extreme cold

Band positions of anatase (001) and (101) surfaces in contact with water from density functional theory

Interfacial Oxide Formation Limits the Photovoltage of -SnWO₄/NiO_x Photoanodes Prepared by Pulsed Laser Deposition