Environmental Assessment of Proton Membrane Flow Battery Project

What is a proton exchange membrane fuel cell?
A proton exchange membrane (PEM) fuel cell,an alternative to combustion processes that consume fossil resources,is used to convert energy stored in the form of hydrogen into electricity. The membrane - electrode assembly (MEA),the core of this system,contains platinum,a noble metal,which is a limited resource.

Can a proton exchange membrane fuel cell be used in lightweight FCVS?
Miotti evaluated the environmental impact (E- LCA) and cost (LCC) of a proton exchange membrane fuel cell (PEMFC) system for use in lightweight FCVs and integrated these results into a comparative assessment between FCVs, battery electric vehicles (BEVs), and internal combustion engine vehicles (ICEVs).

How are environmental impacts assessed in a molten carbonate fuel cell?
The environmental impacts were assessed using the CML-IA baseline V3.02 method. This method was used previously by Zucaro et al. (2013) in a LCA of a molten carbonate fuel cell,which is in accordance with the guideline for performing LCAs on fuel cells (Masoni and Zamagni,2011). 3.1.

What is a PEM fuel cell?
2. PEM fuel cells A MEA is a stack cellcomprising two GDLs,two electrodes (an anode and a cathode) and an ion conducting membrane that is occasionally supported by a polymeric gasket (see Fig. 1). When the fuel cell operates,hydrogen is oxidised at the platinum surface of the anode into H +and electrons.

Why is Nafion ® membrane recycling important?
Furthermore, tetrafluoroethylene production is the second burden of MEA life-cycle, and its importance in the PEM fuel cell life-cycle is increased, so Nafion ® membrane recycling should be investigated.

(LCC) of a proton exchange membrane fuel cell (PEMFC) sys-tem for use in lightweight FCVs and integrated these results into a comparative assessment between FCVs, battery electric

Within this framework, a life cycle sustainability assessment (LCSA) of a PEMFC stack was conducted to evaluate its potential environmental, economic, and social impacts. The climate change...

With the rapid growth and development of proton-exchange membrane fuel cell (PEMFC) technology, there has been increasing demand for clean and sustainable global energy applications. Of the many ...

Proton exchange membrane (PEM) fuel cells could be an alternative energy conversion process, whereby electricity is produced by a reaction between oxygen and hydrogen; the only by-products are heat and water. The redox reactions involved are catalysed by platinum nanoparticles present on the electrodes. The core of a PEM fuel cell is ...

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In the framework of this project, a life cycle sustainability assessment (LCSA) of a protonexchange membrane fuel cell (PEMFC) stack was performed to estimate its potential ...

Flow battery production Environmental impact Energy storage Battery manufacturing Materials selection Life cycle assessment abstract Energy storage systems, such as flow batteries, are essential for integrating variable renewable energy sources into the electricity grid. While a primary goal of increased renewable energy use on the grid is to mitigate environmental ...

Future FCH production will need to implement ecodesign actions to minimise the environmental impact. The EU-funded project eGHOST defines ecodesign actions for FCH ...

The EU-funded project eGHOST supports the fuel cells and hydrogen (FCH) industry in shaping the eco (re)design of hydrogen-related products such as proton exchange ...

s (SOFCs), and Alkaline Fuel Cells (AFCs), by conducting an Attributional Life Cycle Assessment (ALCA) within a cradle-to-gate system boundary. The study seeks to answer fundamental . esearch questions related to their environmental performance and identify critical stages contributing to their Global Warming Po.

Assessment, LCSA). This paper aims at assessing the social life-cycle impacts associated with the manufacturing of a 48 kW Proton Exchange Membrane Fuel Cell (PEMFC) stack, in the framework of the EU-funded project eGHOST (6). Within this project, this S-LCA study will complement the corresponding environmental Life Cycle Assessment (LCA) and Life

The goal of this study is to conduct a detailed environmental impact assessment of flow battery production and to evaluate the sensitivity of the results to materials selection and system design choices. The battery production phase is comprised of raw materials extraction, materials processing, component manufacturing, and product assembly, as shown in Fig. 1. ...

The EU-funded project eGHOST supports the fuel cells and hydrogen (FCH) industry in shaping the eco (re)design of hydrogen-related products such as proton exchange membrane fuel cell (PEMFC) stacks.

Social Life Cycle Assessment (S-LCA) is an insightful methodology to evaluate potential social impacts of products along their life cycle. In the frame of the project eGHOST, social risks of a ...

Proton exchange membrane fuel cells (PEMFCs) generate power from clean resources, such as hydrogen and air/O 2 has a high energy conversion efficiency from the chemical energy of a fuel and an oxidant to electric power, reaching about 60 % [1], [2].The PEMFCs typically operate at low temperatures (<80 °C) [3]; they are not preferred to run at ...

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