Process for gas enrichment

Key energy Anlagen GmbH

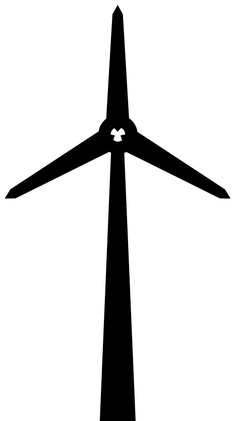
Patent

01.01.2023

Page 1

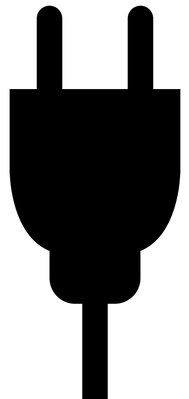
The invention relates to a method for the electrolytic provision of an oxygen-containing and hydrogen-containing gas mixture, whereby electricity is introduced via electrodes into a liquid electrolysis medium and thus oxygen gas and hydrogen gas is generated, which exits from the electrolysis medium in at least partially mixed form as electrolysis gas.

It also concerns an electrolysis device for the electrolytic production of an oxygen-containing and hydrogen-containing gas mixture, whereby the electrolysis device has at least one container for receiving electrolysis medium and has electrodes arranged therein for the introduction of electricity into the electrolysis medium.



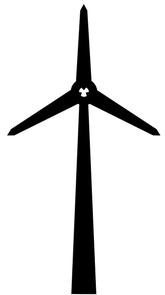
Page 2

In water electrolysis, water from a liquid electrolysis medium is converted into hydrogen gas and oxygen gas by introducing electricity. These gases rise when they arise from the electrodes. When hydrogen and oxygen are mixed, fire gas is produced, also HHO or Brownian gas, hereinafter referred to as electrolysis gas. This gas can be used well as fuel, but is highly explosive and flammable and therefore poses a safety risk. Therefore, the hydrogen gas and oxygen gas are often separated immediately after formation in order to avoid mixing. However, more complex structures are necessary for this and, if necessary, partial mixing cannot be completely prevented.



Page 3

Accordingly, the task of the invention is to increase the safety of the electrolysis or the electrolysis device and still provide a well-usable gas mixture.
According to the invention, this task is solved by the fact that immediately after the exit, the electrolysis gas is mixed with an additional gas, which includes low hydrocarbons, to form a gas mixture.
It is also solved by the fact that at least one inlet of the container is connected to an additional gas source to supply the container with an additional gas containing low hydrocarbons.
By directly mixing the electrolysis gas with the additive gas, the proportion of oxygen in the gas mixture is reduced.
This greatly reduces the risk of explosion and makes it possible to easily handle the gas. The hydrocarbons ensure that the resulting gas mixture is still flammable and can be used well as fuel.



Page 4

Immediately after the exit, this means that the mixing with the additional gas takes place in the area of the liquid surface of the electrolysis medium, i.e. in the gas chamber above the electrolysis medium. Therefore, long transport routes of the pure electrolysis gas should be avoided in order to reduce the risk of explosion as much as possible. Preferably, the mixing should begin at the latest at a distance of 1 meter from the liquid surface.
It can also be provided that the mixing with the additional gas begins before the exit from the electrolysis medium. This can be achieved, for example, by introducing the additional gas into the electrolysis medium.
The additional gas is preferably already flammable itself. Flammability means that the gas in question can continue to burn after suitable ignition with suitable oxygen supply, without the need for additional fuels. Alternatively, it can also be provided that the additional gas is not flammable on its own, but that the gas mixture obtained from the process according to the invention is already flammable.