Title (en)

ELECTROCHEMICAL METHOD FOR PRODUCING PRESSURISED GASEOUS HYDROGEN BY ELECTROLYSIS THEN BY ELECTROCHEMICAL CONVERSION

Title (de)

ELEKTROCHEMISCHES VERFAHREN ZUR HERSTELLUNG VON UNTER DRUCK STEHENDEM GASFÖRMIGEM WASSERSTOFF DURCH ELEKTROLYSE UND DANN DURCH ELEKTROCHEMISCHE UMWANDLUNG

Title (fr)

PROCEDE ELECTROCHIMIQUE DE PRODUCTION D'HYDROGENE GAZEUX SOUS PRESSION PAR ELECTROLYSE PUIS PAR CONVERSION ELECTROCHIMIQUE

Publication

EP 3775324 A1 20210217 (FR)

Application

EP 19720964 A 20190403

Priority

- FR 1852886 A 20180403
- FR 2019050775 W 20190403

Abstract (en)

[origin: WO2019193283A1] The invention relates to an electrochemical method for producing gaseous hydrogen by electrolysis then electrochemical conversion of H+ ions into gaseous hydrogen, either by depolarisation with production of electrical energy (battery) or by catalysis. The aim of the invention is to improve said method in order to reach, industrially, high pressures of gaseous hydrogen, for example >80 bars. To this end, the method essentially consists in implementing, in a decoupled manner, at least one step of El electrolysis of an electrolyte producing gaseous oxygen in a chamber El, and at least one step of electrochemical conversion C° of H+ ions into gaseous hydrogen in a chamber C° containing a liquid phase L and a gaseous phase G which is not dissolved in said liquid phase. In said method: the gaseous hydrogen produced in the conversion step C° is partially present in the crown of the chamber C° and in the form of bubbles in the electrolyte and partially dissolved in the electrolyte which as a result becomes saturated with hydrogen; the electrolyte comprises at least one redox couple (A/B) forming at least one intermediate vector allowing the decoupling of the steps El & C°; the interface between phase G and phase L is increased during step C° in such a way as to accelerate the diffusion of the liquid phase to the gaseous phase, dissolved hydrogen potentially supersaturating the electrolyte; and the pressurised gaseous hydrogen is collected in a reservoir. The invention also relates to devices for implementing such a production method and to a kit comprising one of said devices and components of the electrolyte.

IPC 8 full level

C25C 1/06 (2006.01); **C01B 3/08** (2006.01); **C25B 1/04** (2021.01); **C25B 5/00** (2006.01); **C25B 15/00** (2006.01); **C25C 1/12** (2006.01); **C25C 1/16** (2006.01); **H01M 12/08** (2006.01)

CPC (source: EP US)

C25B 1/04 (2013.01 - EP US); **C25B 1/50** (2021.01 - EP); **C25B 5/00** (2013.01 - EP); **C25B 15/00** (2013.01 - EP); **C25B 15/08** (2013.01 - US); C25B 9/70 (2021.01 - US); C25C 1/06 (2013.01 - EP); C25C 1/08 (2013.01 - EP); C25C 1/10 (2013.01 - EP); C25C 1/12 (2013.01 - EP); C25C 1/14 (2013.01 - EP); C25C 1/16 (2013.01 - EP); C25C 1/20 (2013.01 - EP); C25C 1/22 (2013.01 - EP); Y02E 60/36 (2013.01 - EP); Y02E 60/50 (2013.01 - EP)

Designated contracting state (EPC)

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated extension state (EPC)

BA ME

DOCDB simple family (publication)

FR 3079530 A1 20191004; **FR 3079530 B1 20240426**; EP 3775324 A1 20210217; US 11549186 B2 20230110; US 2021079536 A1 20210318; WO 2019193283 A1 20191010

DOCDB simple family (application)

FR 1852886 A 20180403; EP 19720964 A 20190403; FR 2019050775 W 20190403; US 201917041482 A 20190403