

Title (en)

ELECTROLYTIC CELL FOR POLYMER ELECTROLYTE MEMBRANE ELECTROLYSIS AND METHOD FOR PRODUCING SAME

Title (de)

ELEKTROLYSEZELLE ZUR POLYMERELEKTROLYTMEMBRAN-ELEKTROLYSE UND VERFAHREN ZU DEREN HERSTELLUNG

Title (fr)

CELLULE D'ÉLECTROLYSE DESTINÉE À L'ÉLECTROLYSE À MEMBRANE ÉLECTROLYTIQUE POLYMÈRE ET SON PROCÉDÉ DE FABRICATION

Publication

**EP 4112781 A1 20230104 (DE)**

Application

**EP 21182692 A 20210630**

Priority

EP 21182692 A 20210630

Abstract (en)

[origin: WO2023274601A1] The invention relates to an electrolytic cell (1) for polymer electrolyte membrane electrolysis with a cathode half-cell (2) and an anode half-cell (3), the cathode half-cell (2) and the anode half-cell (3) being separated from one another by means of a polymer electrolyte membrane (4). The cathode half-cell (2) has a first catalyst material (5) designed to catalyze a reduction of molecular oxygen, and a second catalyst material (6) designed to catalyze a reduction of hydrogen ions. The first catalyst material (5) is introduced into a first catalyst layer (7) and the second catalyst material (6) is introduced into a second catalyst layer (8) different from the first catalyst layer (7), the first catalyst layer (7) being disposed directly adjacent to the second catalyst layer (8). The invention also relates to a method (100) for producing an electrolytic cell (1) for polymer electrolyte membrane electrolysis.

Abstract (de)

Es wird eine Elektrolysezelle (1) zur Polymerelektrolytmembran-Elektrolyse mit einer kathodischen Halbzelle (2) und einer anodischen Halbzelle (3) angegeben, wobei die kathodische Halbzelle (2) und die anodische Halbzelle (3) mittels einer Polymerelektrolytmembran (4) voneinander getrennt sind. Die kathodische Halbzelle (2) weist ein erstes Katalysatormaterial (5), ausgebildet zur Katalyse einer Reduktion von molekularem Sauerstoff, auf. Daneben wird ein Verfahren (100) zur Herstellung einer Elektrolysezelle (1) zur Polymerelektrolytmembran-Elektrolyse angegeben.

IPC 8 full level

**C25B 3/25** (2021.01); **C25B 9/23** (2021.01); **C25B 11/052** (2021.01); **C25B 11/053** (2021.01); **C25B 11/061** (2021.01); **C25B 11/067** (2021.01); **C25B 11/075** (2021.01); **C25B 11/089** (2021.01)

CPC (source: EP)

**C25B 1/04** (2013.01); **C25B 3/25** (2021.01); **C25B 9/23** (2021.01); **C25B 11/052** (2021.01); **C25B 11/053** (2021.01); **C25B 11/061** (2021.01); **C25B 11/067** (2021.01); **C25B 11/075** (2021.01); **C25B 11/089** (2021.01)

Citation (applicant)

- EP 3489394 A1 20190529 - SIEMENS AG [DE]
- KUMAR, S ET AL.: "Hydrogen production by PEM water electrolysis - A review", MATERIALS SCIENCE FOR ENERGY TECHNOLOGIES, vol. 2, no. 3, 2019, pages 442 - 454, Retrieved from the Internet <URL:https://doi.org/10.1016/j.mset.2019.03.002>
- SCHALENBACH, M. ET AL.: "Pressurized PEM water electrolysis: Efficiency and gas crossover", INTERN. J. HYDR. ENER., vol. 38, no. 35, 2013, pages 14921 - 14933, XP028762381, Retrieved from the Internet <URL:https://doi.org/10.1016/j.ijhydene.2013.09.013> DOI: 10.1016/j.ijhydene.2013.09.013
- DU, Z.; LIU, C.; ZHAI, J.; GUO, X.; XIONG, Y.; SU, W.; HE, G.: "A Review of Hydrogen Purification Technologies for Fuel Cell Vehicles", CATALYSTS, vol. 11, 2021, pages 393, Retrieved from the Internet <URL:https://doi.org/10.3390/catal11030393>
- YU, J. ET AL.: "A mini-review of noble-metal-free electrocatalysts for overall water splitting in non-alkaline electrolytes", MAT. REP.: ENERGY, vol. 1, no. 2, 2021, pages 100024, Retrieved from the Internet <URL:https://doi.org/10.1016/j.matre.2021.100024>

Citation (search report)

- [XA] EP 3453785 A1 20190313 - TOSHIBA KK [JP]
- [XAI] EP 3553866 A1 20191016 - UNIV BERLIN TECH [DE]
- [XAI] DE 102013019341 A1 20150521 - FORSCHUNGSZENTRUM JUELICH GMBH [DE]
- [XI] US 2021066741 A1 20210304 - PARK HYUN SEO [KR], et al
- [XI] US 2019071783 A1 20190307 - VERDAGUER CASADEVALL ARNAU [DK], et al

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

Designated validation state (EPC)

KH MA MD TN

DOCDB simple family (publication)

**EP 4112781 A1 20230104**; CA 3225562 A1 20230105; CN 117651789 A 20240305; EP 4330445 A1 20240306; WO 2023274601 A1 20230105

DOCDB simple family (application)

**EP 21182692 A 20210630**; CA 3225562 A 20220503; CN 202280046156 A 20220503; EP 2022061776 W 20220503; EP 22727778 A 20220503