



(51) International Patent Classification:

C01B 3/00 (2006.01) *B01J 31/40* (2006.01)
B01J 31/18 (2006.01) *C07C 51/02* (2006.01)
B01J 31/22 (2006.01) *C07C 51/41* (2006.01)
B01J 31/24 (2006.01)

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(21) International Application Number:

PCT/HU2022/050056

(22) International Filing Date:

01 July 2022 (01.07.2022)

(25) Filing Language:

Hungarian

(26) Publication Language:

English

(30) Priority Data:

P2100254 02 July 2021 (02.07.2021) HU
P2200115 13 April 2022 (13.04.2022) HU

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(81) **Designated States** (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

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(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,

(54) **Title:** HYDROGEN STORAGE BASED ON AQUEOUS FORMATE-BICARBONATE (HYDROGEN CARBONATE) EQUILIBRIUM

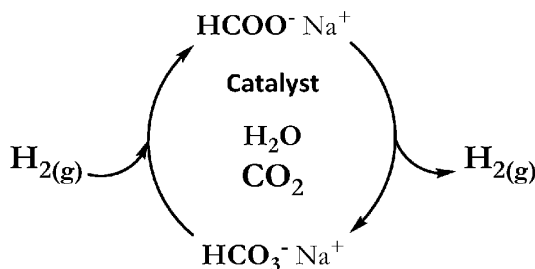


FIG. 1

(57) **Abstract:** The subject of the invention is a process for the hydrogenation of hydrogen carbonate in an aqueous reaction system, where the process ensures that the hydrogen carbonate, hydrogen and catalyst come into contact with each other while carbon dioxide is present in the gas space. In this phase of the process, formate is produced. The subject of the invention is also a process for the catalytic decomposition of formate in an aqueous reaction system and the hydrogenation of hydrogen carbonate produced in the same reaction system according to the invention, where the reactants and the reaction products are formed in a reversible reaction cycle using the reaction system according to the invention, and this reaction cycle is repeated in the required number of times. In the mentioned formate decomposition process, the formate and the catalyst come into contact, so that hydrogen gas and hydrogen carbonate free of COX by-products are produced as the product of the reaction. Further subject of the invention is a hydrogen storage system based on the method according to the invention, preferably a hydrogen accumulator. Further subject of the invention is a hydrogen storage system according to the invention, preferably the use of a hydrogen accumulator for the storage of hydrogen required for the operation of a fuel cell (or other equipment requiring H₂) and, where appropriate, for its release in as needed.

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MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
KM, ML, MR, NE, SN, TD, TG).

Published:

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*
- *in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE*