



(51) International Patent Classification:

C01B 5/02 (2006.01) **B01D 59/40** (2006.01)
C25B 1/00 (2006.01) **G01N 1/40** (2006.01)

(21) International Application Number:

PCT/EP2014/065948

(22) International Filing Date:

24 July 2014 (24.07.2014)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

2013-158735 31 July 2013 (31.07.2013) JP

(71) Applicant: **INDUSTRIE DE NORA S.P.A.** [IT/IT]; Via
Bistolfi 35, I-20134 Milan (IT).

(72) Inventors: **MANABE, Akiyoshi**; c/o PERMELEC ELEC-
TRODE, 2023-15 Endo, Fujisawa City, Kanagawa 252-
0816 (JP). **NISHIKI, Yoshinori**; c/o PERMELEC ELEC-
TRODE, 2023-15 Endo, Fujisawa City, Kanagawa 252-
0816 (JP). **KUNIMATSU, Akira**; c/o PERMELEC
ELECTRODE, 2023-15 Endo, Fujisawa City, Kanagawa
252-0816 (JP).

(74) Agent: **REITSTÖTTER KINZEBACH**; Sternwartstraße
4, 81679 München (DE).

(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, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IR, IS, KE, KG, KN, KP, KR,
KZ, LA, LC, LK, LR, LS, LT, 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, SM, ST, SV, SY, TH, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM,
ZW.

(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, 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,
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).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a
patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the
earlier application (Rule 4.17(iii))

Published:

- with international search report (Art. 21(3))

(54) Title: ELECTROLYTIC ENRICHMENT METHOD FOR HEAVY WATER

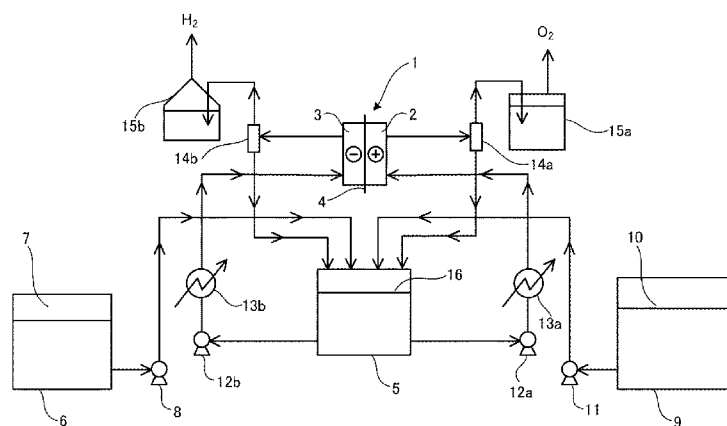


Fig. 1

(57) Abstract: An electrolytic enrichment method for heavy water includes enriching heavy water by electrolysis using an alkaline water electrolysis cell including an anode chamber that holds an anode, a cathode chamber that holds a cathode, and a diaphragm. In the method, an electrolyte prepared by adding high-concentration alkaline water to raw material water containing heavy water is circularly supplied to the anode chamber and the cathode chamber from a circulation tank; an anode-side gas-liquid separator and an anode-side water-seal device are connected to the anode chamber, and a cathode-side gas-liquid separator and a cathode-side water-seal device are connected to the cathode chamber; and electrolysis is continued while the alkali concentration in the electrolyte supplied to both electrolysis chambers is maintained at a constant concentration by circularly supplying, to the circulation tank, the electrolyte from which the gas generated from the anode-side gas-liquid separator and the cathode-side gas-liquid separator is separated.