

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
18 April 2024 (18.04.2024)



(10) International Publication Number
WO 2024/078938 A3

(51) International Patent Classification:
C25C 1/12 (2006.01)

(21) International Application Number:
PCT/EP2023/077459

(22) International Filing Date:
04 October 2023 (04.10.2023)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2022/5827 14 October 2022 (14.10.2022) BE

(71) Applicant: UMICORE [BE/BE]; Rue du Marais 31, 1000 Brussels (BE).

(72) Inventors: SCHUTYSER, Wouter; UMICORE, Watertorenstraat 33, 2250 Olen (BE). KLAASEN, Bart; UMICORE, Watertorenstraat 33, 2250 Olen (BE). LUYTEN, Jan; UMICORE, Watertorenstraat 33, 2250 Olen (BE).

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))

(88) Date of publication of the international search report:
20 June 2024 (20.06.2024)

(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, CV, 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, MG, MK, MN, MU, 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.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, 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, MC, ME, 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))

(54) Title: ADDITIVE-FREE CU ELECTROWINNING

(57) Abstract: The invention concerns an electrowinning process for the recovery of Cu from leaching solutions, in particular from solutions obtained after acidic leaching of lithium-ion batteries or their waste. Electrowinning is performed on an aqueous sulfuric acid solution at a temperature of 50 to 70 °C, wherein the concentration of sulfuric acid is 20 to 100 g/L, wherein the concentration of Cu is at least 2 g/L and at most 15 g/L, and wherein the aqueous acidic solution is free of organic additives. Means for agitating the electrolyte are applied, and a current density of 100 to 210 A/m² is used. These operating conditions ensure that copper is recovered on flat cathodes as a coherent and uniform deposit.



WO 2024/078938 A3