



- (51) **International Patent Classification:**  
*C22B 1/00* (2006.01)                      *C22B 3/44* (2006.01)  
*C22B 3/04* (2006.01)                      *C22B 15/00* (2006.01)  
*C22B 3/26* (2006.01)
- (21) **International Application Number:**  
PCT/IB2022/053011
- (22) **International Filing Date:**  
31 March 2022 (31.03.2022)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**  
2027874                      31 March 2021 (31.03.2021)                      NL
- (71) **Applicant: AFRICAN RAINBOW MINERALS LIMITED** [ZA/ZA]; ARM House, 29 Impala Road, Chislehurst, 2196 Sandton (ZA).
- (72) **Inventor: PRETORIUS, Gerard**; 97 Broadbury Circle, Cornwall Hill Estate, Irene, 0178 Pretoria (ZA).
- (74) **Agent: VISAGIE, Pieter, Johan**; Adams & Adams, PO Box 1014, 0001 Pretoria (ZA).
- (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, 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, UZ, VC, VN, WS, 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, 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, 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 the identity of the inventor (Rule 4.17(i))*
- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *of inventorship (Rule 4.17(iv))*

- (54) Title:** TREATMENT OF HYDROUS ORE MATERIALS

- (57) **Abstract:** A method of treating a hydrous ore material metal values includes a digestion step in which a solution of ferrous chloride ( $\text{FeCl}_2$ ) and a divalent chloride of the at least one other metal ( $\text{M}^{2+}\text{Cl}_2$ ) is produced by contacting the hydrous ore material with gaseous hydrochloric acid. In a crystallisation step, crystallising a solid ferrous chloride hydrate ( $\text{FeCl}_2 \cdot x\text{H}_2\text{O}$ , wherein  $x > 1$ ) and a solid divalent chloride hydrate of the at least one other metal ( $\text{M}^{2+}\text{Cl}_2 \cdot z\text{H}_2\text{O}$ , wherein  $z \geq 1$ ) from the solution. In a dehydration step, the  $\text{FeCl}_2 \cdot x\text{H}_2\text{O}$  and the  $\text{M}^{2+}\text{Cl}_2 \cdot z\text{H}_2\text{O}$  are subjected to temperature treatment to produce  $\text{FeCl}_2 \cdot y\text{H}_2\text{O}$ , wherein  $x > y > 0$ , and  $\text{M}^{2+}\text{Cl}_2 \cdot a\text{H}_2\text{O}$ , wherein  $z > a \geq 0$ . In a thermal decomposition step, the  $\text{FeCl}_2 \cdot y\text{H}_2\text{O}$  is decomposed to produce anhydrous gaseous hydrochloric acid (HCl), which is used as the digestion reagent in the digestion step.

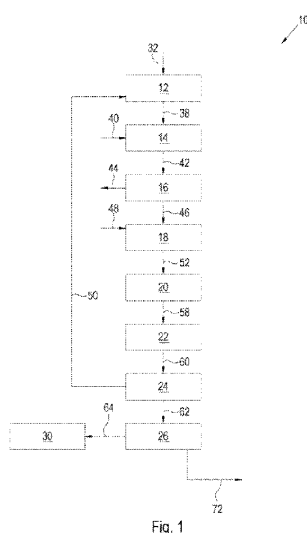


Fig. 1

**Published:**

- with international search report (Art. 21(3))
- in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE