

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
10 November 2022 (10.11.2022)



(10) International Publication Number
WO 2022/235710 A1

- (51) **International Patent Classification:**
C01B 32/225 (2017.01)
- (21) **International Application Number:**
PCT/US2022/027526
- (22) **International Filing Date:**
03 May 2022 (03.05.2022)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
63/184,176 04 May 2021 (04.05.2021) US
- (71) **Applicant:** **TMTPLABS, INC.** [US/US]; 2000 Lakeshore Drive #7011, New Orleans, Louisiana 70148 (US).
- (72) **Inventors:** **RUSTINE, Timothy**; 2000 Lakeshore Drive #7011, New Orleans, Louisiana 70148 (US). **KELLY, Matthew**; 2000 Lakeshore Drive #7011, New Orleans, Louisiana 70148 (US). **ROBBINS, Seann**; 2000 Lakeshore Drive #7011, New Orleans, Louisiana 70148 (US).
- (74) **Agent:** **HECHT, Kinza**; 10 Notch Hill Dr., Livingston, New Jersey 07039 (US).
- (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.

- (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 applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

- (54) **Title:** APPARATUS AND METHOD FOR EXFOLIATING GRAPHITE

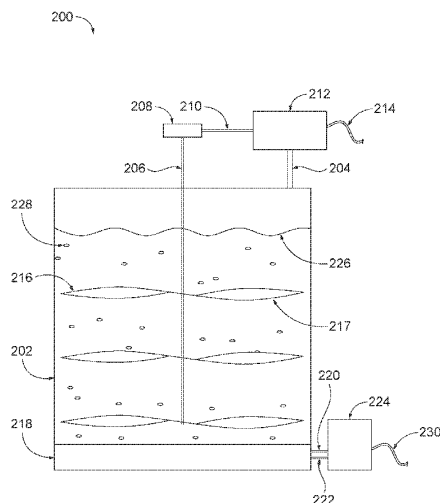


FIG. 2

(57) **Abstract:** An apparatus and method to exfoliate a graphite grain is described. A mixture of a graphite grain and a fluid medium are transferred into a vessel. The vessel includes an agitator and a chiller. The chiller chills the mixture such that the fluid medium at least partially solidifies into an ice grain. The agitator agitates the mixture to induce a contact between the graphite grain and the ice grain. The contact between the graphite grain and the ice grain exfoliates the graphite grain.

WO 2022/235710 A1

[Continued on next page]

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))*