

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
17 March 2022 (17.03.2022)



(10) International Publication Number
WO 2022/056189 A1

(51) International Patent Classification:

C10B 55/02 (2006.01) C10B 57/06 (2006.01)
C10B 57/04 (2006.01) C04B 35/528 (2006.01)

(21) International Application Number:

PCT/US2021/049753

(22) International Filing Date:

10 September 2021 (10.09.2021)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/077,002 11 September 2020 (11.09.2020) US

(71) Applicant: **ARQ IP LIMITED** [GB/GB]; 64 New Cavendish Street, London Middlesex W1G 8TB (GB).

(72) Inventor; and

(71) Applicant: **PASPEK, Stephen Carl** [US/US]; 459 Quail Run Drive, Broadview Heights, Ohio 44147 (US).

(72) Inventors: **UNSWORTH, John Francis**; c/o Arq IP Limited, 64 New Cavendish Street, London Middlesex W1G

8TB (GB). **ADAMS, Jeramie Joseph**; c/o Arq IP Limited, 64 New Cavendish Street, London Middlesex W1G 8TB (GB). **BASSHAM, Seth Taylor**; c/o Arq IP Limited, 64 New Cavendish Street, London Middlesex W1G 8TB (GB).

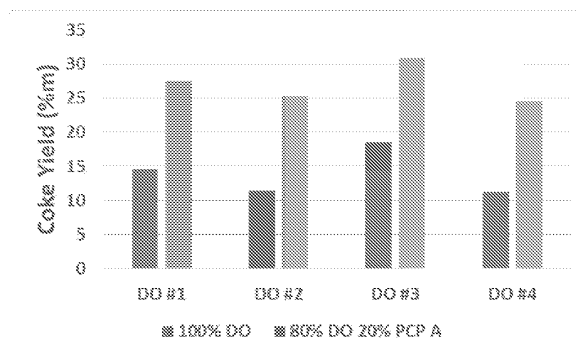
(74) Agent: **MOLLOY, Matthew A.** et al.; DINSMORE & SHOHL LLP, One South Main Street, Suite 1300, Dayton, Ohio 45402 (US).

(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, IR, IS, IT, 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,

(54) Title: METHODS FOR THE PRODUCTION OF INCREASED ANISOTROPIC COKE

Figure 6



(57) Abstract: There is provided a process for the production of anisotropic coke, the process comprising providing a purified coal product (PCP), wherein the PCP is in particulate form, and wherein at least about 90% by volume (%v) of the particles are no greater than about 100 μ m in diameter; wherein the PCP has an ash content of less than about 10% and a water content of less than around 5%. The PCP is combined with a feedstock oil, such as a decant oil, in order to create a combined solid-liquid blend, wherein the solid-liquid blend comprises at least around 0.1 %m and at most around 50% PCP. The solid-liquid blend is subjected to a temperature in excess of 400 $^{\circ}$ C, typically as part of a delayed coker process, for a time period sufficient to induce formation of mesophase, and production of anisotropic coke. Improved yields of valuable needle coke can be obtained via the processes described.

[Continued on next page]

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))*