



(51) International Patent Classification:

B01J 23/889 (2006.01) *B01J* 23/755 (2006.01)
B01J 3/06 (2006.01) *C30B* 29/04 (2006.01)
B01J 23/75 (2006.01)

(21) International Application Number:

PCT/EP2013/055173

(22) International Filing Date:

13 March 2013 (13.03.2013)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

1204533.2 15 March 2012 (15.03.2012) GB

(71) Applicant: ELEMENT SIX LIMITED [GB/GB]; Isle of Man Freeport, P.O. Box 6, Ballasalla IM99 6AQ (GB).

(72) Inventors: BORSE, Dietrich; Nordalbingeweg 79b, 22455 Hamburg (DE). GURA, Eugen; Poppenbuetteler Weg 141, 22399 Hamburg (DE). DODGE, Carlton Nigel; Element Six Limited, Isle of Man Freeport, P O Box 6, Ballasalla IM99 6AQ (GB). SPITS, Raymond Anthony; Element Six Limited, Isle of Man Freeport, P.O. Box 6, Ballasalla IM99 6AQ (GB).

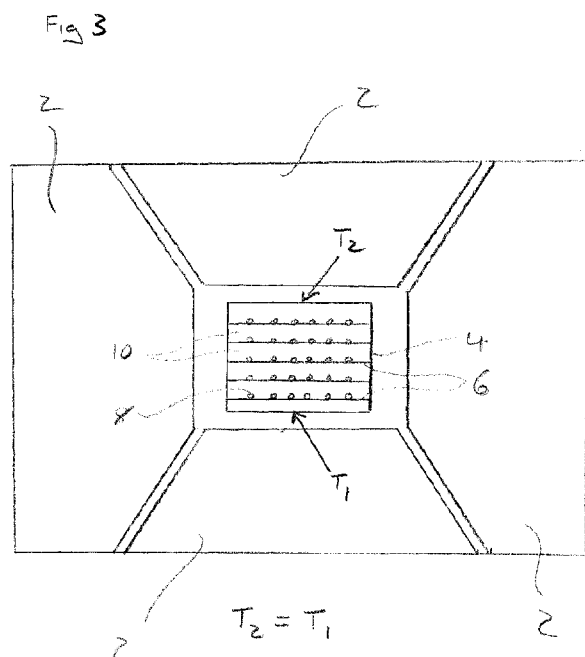
(74) Agents: ATKINSON, Ian Anthony et al.; Element Six Limited, Group Intellectual Property, 3rd Floor, Building 4, Chiswick Park, 566 Chiswick High Road, London Greater London W4 5YE (GB).

(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, IS, JP, KE, KG, KM, 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, 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,

[Continued on next page]

(54) Title: PROCESS FOR MANUFACTURING SYNTHETIC SINGLE CRYSTAL DIAMOND MATERIAL



(57) Abstract: A method for manufacturing a plurality of synthetic single crystal diamonds, the method comprising: forming a plurality of seed pads, each seed pad comprising a plurality of single crystal diamond seeds anchored to, or embedded in, an inert holder; loading a carbon source, a metal catalyst, and the plurality of seed pads into a capsule; loading the capsule into a high pressure high temperature (HPHT) press; and subjecting the capsule to a HPHT growth cycle to grow single crystal diamond material on the plurality of single crystal diamond seeds, the HPHT growth cycle comprising: initiating HPHT growth of single crystal diamond material on the plurality of single crystal diamond seeds by increasing pressure and temperature; maintaining HPHT growth of single crystal diamond material on the plurality of single crystal diamond seeds via a pressure driven growth process by controlling and maintaining pressure and temperature; and terminating HPHT growth of single crystal diamond material on the plurality of single crystal diamond seeds by reducing pressure and temperature, wherein the plurality of single crystal diamond seeds remain anchored to, or embedded in, the inert holders during the HPHT growth cycle.



TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
ML, MR, NE, SN, TD, TG).

— *of inventorship (Rule 4.17(iv))*

Declarations under Rule 4.17:

Published:

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

— *with international search report (Art. 21(3))*