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[Continued on next page]

(54) **Title**: TECHNIQUES FOR PRODUCING THIN FILMS OF SINGLE CRYSTAL DIAMOND

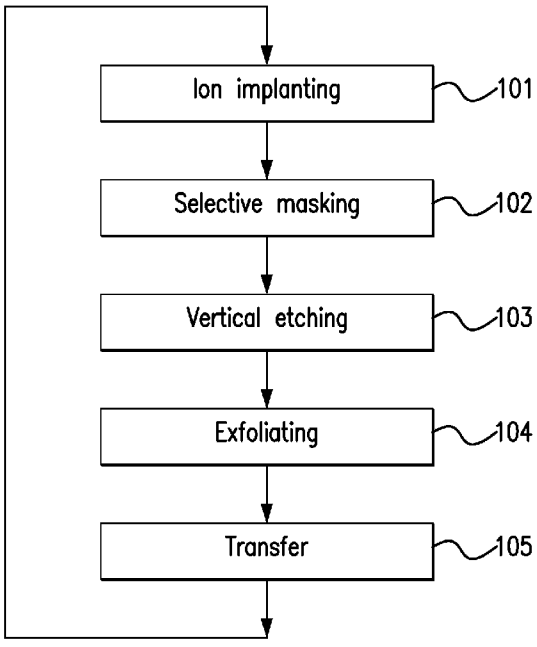

FIG. 1

(57) **Abstract**: Techniques for fabricating thin single crystal diamond films from a diamond structure having a top surface including implanting a dose of ions at a predetermined depth below the top surface to form a damage layer, selectively masking the top surface to expose one or more portions of the diamond structure, vertically etching one or more of the exposed portions to the predetermined depth, and exfoliating the unexposed portion to form at least one thin single crystal diamond film.

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A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - C30B 29/00 (2012.01)
USPC - 117/84; 257/77
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
USPC -- 117/84; 257/77

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PubWEST (USPT, PGPB, JPAB, EPAB); Google
Search Terms: Thin film diamond, microwave, etching, dopant, impurity, depth, concentration, damage, expose, exfoliate, energy, chamber, anneal, oven, inductively coupled, wet, vertical

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2010/0084634 A1 (Gamo et al.) 08 Apr 2010 (08.04.2010), entire document especially Abstract, para [0040]-[0041], [0053], [0190]-[0197], [0226] and [0332]	1-20
Y	US 2010/0320475 A1 (Speck et al.) 23 Dec 2010 (23.12.2010), entire document especially Abstract, para [0049], [0022] and [0067]	1-20
Y	US 5,173,761 A (Dreifus et al.) 22 Dec 1992 (22.12.1992), entire document especially Abstract, col 5, ln 25-37	10-11 and 17-18

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
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