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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
5 February 2004 (05.02.2004)

PCT

(10) International Publication Number
WO 2004/012246 A2

(51) International Patent Classification[7]: H01L 21/033

(21) International Application Number:
PCT/US2003/023746

(22) International Filing Date: 29 July 2003 (29.07.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/400,453 31 July 2002 (31.07.2002) US
10/334,392 30 December 2002 (30.12.2002) US

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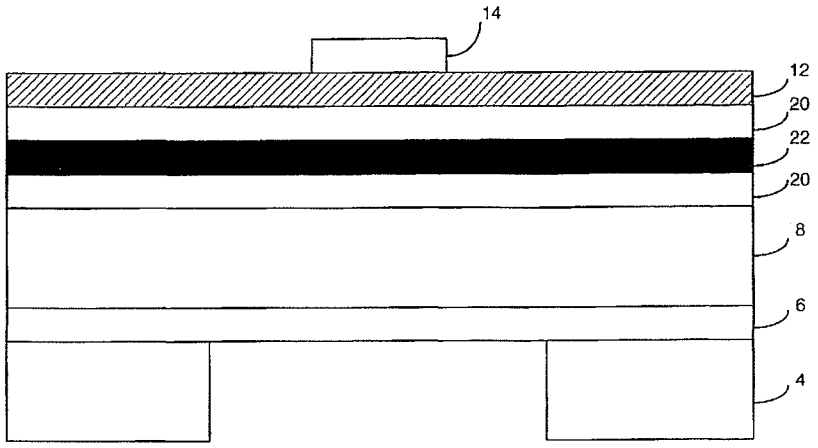
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(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE,

*[Continued on next page]*

(54) Title: METHOD FOR REDUCING PATTERN DEFORMATION AND PHOTORESIST POISONING IN SEMICONDUCTOR DEVICE FABRICATION




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(57) Abstract: A hardmask stack is comprised of alternating layers of doped amorphous carbon (22) and undoped amorphous carbon (20). The undoped amorphous carbon layers (20) serve as buffer layers that constrain the effects of compressive stress within the doped amorphous carbon layers (22) to prevent delamination. The stack is provided with a top capping layer (12). The layer beneath the capping layer (12) is preferably undoped amorphous carbon to reduce photoresist poisoning. An alternative hardmask stack is comprised of alternating layers of capping material (42) and amorphous carbon (40). The amorphous carbon layers (40) may be doped or undoped. The capping material layers (42) serve as buffer layers that constrain the effects of compressive stress within the amorphous carbon layers (40) to prevent delamination. The top layer of the stack is formed of a capping material (42). The layer beneath the top layer is preferably undoped amorphous carbon (40) to reduce photoresist poisoning. The lowest layer of the hardmask stack is preferably amorphous carbon (40) to facilitate easy removal of the hardmask stack from underlyingmaterials(8) by an ashing process.

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SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) **Designated States** *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

— *without international search report and to be republished upon receipt of that report*

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