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- (71) **Applicant:** **LAM RESEARCH CORPORATION**
[US/US]; 4650 Cushing Pkwy., Fremont, California 94538 (US).
- (72) **Inventors:** **HUANG, Yanhui**; 4650 Cushing Pkwy., Fremont, California 94538 (US). **WANG, Ruisong**; 4650 Cushing Pkwy., Fremont, California 94538 (US). **SHAIKH, Fayaz A.**; 4650 Cushing Pkwy., Fremont, California 94538 (US). **CHAN, Michael Anthony**; 4650 Cushing Pkwy., Fremont, California 94538 (US).
- (74) **Agent:** **MURRY, Price W.** et al.; P.O. Box. 70250, Oakland, California 94612-0250 (US).
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(54) **Title:** APPARATUSES AND METHODS TO CONTROL WAFER WARPAGE COMPENSATION ALONG X/Y DIRECTIONS

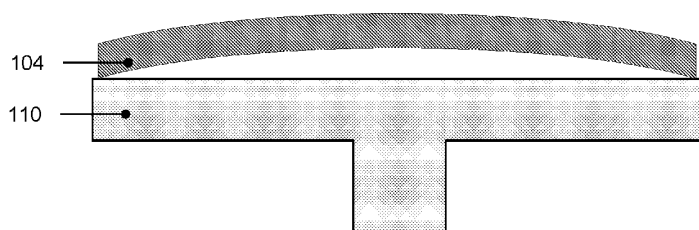


FIG. 1B

(57) **Abstract:** Provided are methods, apparatuses, and structure for mitigating wafer bow of a semiconductor wafer. Deposition of a backside layer stack may mitigate wafer bow that varies in orthogonal directions. Each of the backside layers may be deposited by a backside deposition apparatus. Therefore, they provide a complementary film stack having a substantially flat surface on the backside of the substrate.



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