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- (71) Applicant: **LAM RESEARCH CORPORATION**
[US/US]; 4650 Cushing Parkway, Fremont, California
94538 (US).
- (72) Inventors: **AGNEW, Douglas Walter**; 4650 Cushing
Parkway, Fremont, California 94538 (US). **LAVOIE,**
Adrien; 4650 Cushing Parkway, Fremont, California 94538
(US).
- (74) Agent: **GAVRILOVA, Anna L.** et al.; Weaver Austin Vil-
leneuve & Sampson LLP, P. O. Box 70250, Oakland, Cali-
fornia 94612-0250 (US).
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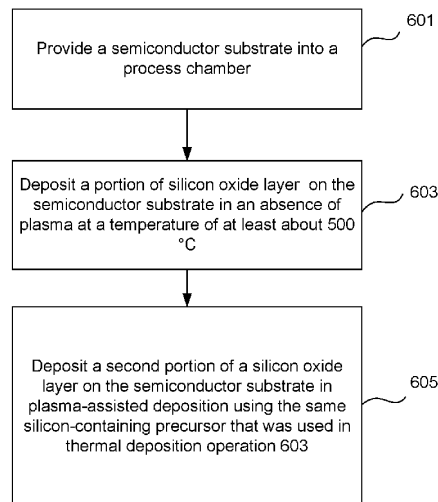


Figure 6

(57) Abstract: Silicon-containing films, such as silicon oxide films, having high quality are deposited on semiconductor substrates using reactions of silicon-containing precursors in high temperature ALD processes. In some embodiments, provided precursors are suitable for deposition of silicon-containing films at temperatures of at least about 500°C, such as greater than about 550°C. For example, silicon oxide can be deposited at high temperature by a reaction of the silicon-containing precursor with an oxygen-containing reactant (e.g., O₃, O₂, H₂O) on a substrate's surface. In some implementations, the suitable precursor includes at least one silicon-silicon bond, at least one leaving group (e.g., a halogen), and, optionally, at least one electron-donating group (e.g., an alkyl). The precursors are suitable, in some implementations, for both thermal ALD and for PEALD. In some

[Continued on next page]

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embodiments, a single precursor is used in both thermal ALD and in PEALD during deposition of a single silicon oxide film.