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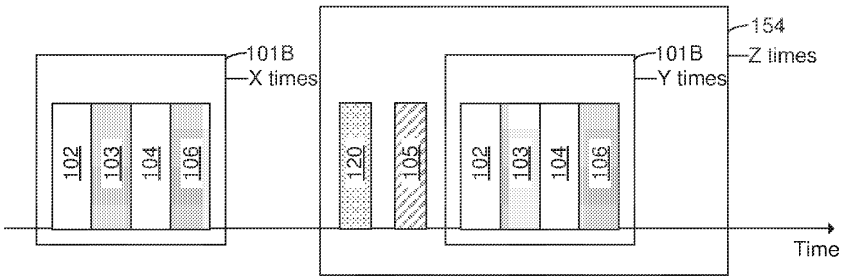


FIG. 1D

(57) Abstract: Various embodiments herein relate to methods and apparatus for depositing doped and undoped silicon-containing films having a high degree of purity. In one example, the method includes exposing the substrate to a first reactant and a second reactant; reacting the first and second reactants with one another to form a silicon-containing material and depositing a portion of the silicon-containing film on the substrate; before the silicon-containing film is complete, performing an impurity reduction operation including: (i) generating a plasma from a plasma generation gas comprising inert gas and hydrogen, where the plasma generation gas is substantially free of oxygen, and (ii) exposing the substrate to the plasma to thereby reduce a concentration of fluorine, carbon, hydrogen, and/or nitrogen in the silicon-containing film; and repeating these operations (or a subset thereof) until the silicon-containing film is deposited to a final thickness.

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