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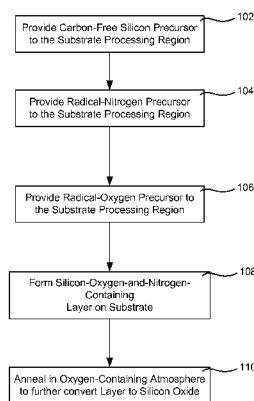


FIG 1

(57) Abstract: Methods of forming silicon oxide layers are described. The methods include the steps of concurrently combining both a radical precursor and a radical-oxygen precursor with a carbon-free silicon-containing precursor. One of the radical precursor and the silicon-containing precursor contain nitrogen. The methods result in depositing a silicon-oxygen-and-nitrogen-containing layer on a substrate. The oxygen content of the silicon-oxygen-and-nitrogen-containing layer is then increased to form a silicon oxide layer which may contain very little nitrogen. The radical-oxygen precursor and the radical precursor may be produced in separate plasmas or the same plasma. The increase in oxygen content may be brought about by annealing the layer in the presence of an oxygen-containing atmosphere and the density of the film may be increased further by raising the temperature even higher in an inert environment.