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(54) Title: SILICON-CONTAINING FILMS HAVING SURFACES MODIFIED FROM HALOGENATED SILICON-CON-
TAINING COMPOUNDS

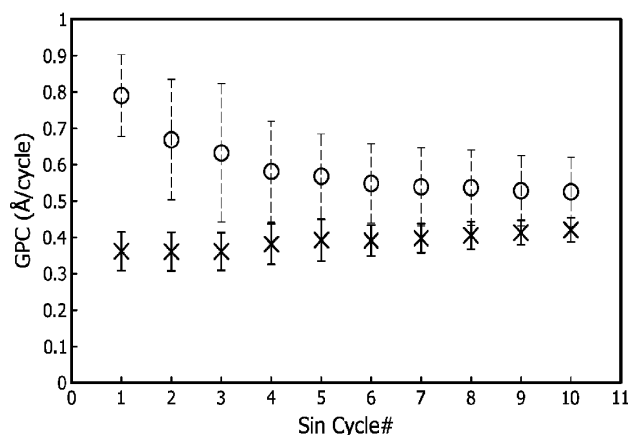
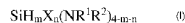


FIG. 1



(57) Abstract: A method for deposition of a high quality smooth and continuous silicon- containing film includes a) providing at least one substrate in a reactor, b) heating the reactor to at least one temperature ranging from ambient temperature to about 750°C and optionally maintaining the reactor at a pressure of about 100 torr or less, c) introducing into the reactor at least one first silicon precursor comprising at least one organoamino group and at least one halido group having a formula wherein $m = 0, 1, 2$; $n = 1, 2, 3$, and $m + n < 3$; X is selected from the group consisting of Cl, Br, and I; R^1 and R^2 are each independently selected from the group consisting of a linear or branched C_1 to C_{10} alkyl group, a linear or branched C_3 to C_{10} alkenyl group, a linear or branched C_3 to C_{10} alkynyl group, a C_3 to C_{10} cyclic alkyl group, a C_2 to C_6 dialkylamino group, an electron

[Continued on next page]

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withdrawing group, and a C₆ to C₁₀ aryl group, to form a first silicon-containing layer, d) purging any unreacted precursor from the reactor using inert gas, e) introducing a nitrogen source to react with the first silicon-containing layer to form a seed layer comprising at least one selected from the group consisting of silicon nitride and carbon doped silicon nitride, f) purging the reactor using inert gas, g) introducing at least one second silicon precursor comprising a halogenated silicon-containing compound into the reactor to react with the seed layer and form a second silicon-containing layer comprising at least one selected from the group consisting of silicon nitride, carbon doped silicon nitride, silicon oxynitride and carbon doped silicon oxynitride, h) purging the reactor using inert gas, i) introducing a nitrogen source to react with the second silicon-containing layer to form a silicon nitride or carbon doped silicon nitride, and j) purging the reactor using inert gas.