

[54] SELECTIVE PLASMA ETCHING OF SILICON NITRIDE IN PRESENCE OF SILICON OR SILICON OXIDES USING MIXTURE OF CH<sub>3</sub>F OR CH<sub>2</sub>F<sub>2</sub> AND CF<sub>4</sub> AND O<sub>2</sub>

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60-115231 6/1985 Japan .

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[57] ABSTRACT

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A chemical downstream etching (CDE) that is selective to silicon nitrides (SiN) over silicon oxides (SiO) uses at least one of a CH<sub>3</sub>F/CF<sub>4</sub>/O<sub>2</sub> recipe and a CH<sub>2</sub>F<sub>2</sub>/CF<sub>4</sub>/O<sub>2</sub> recipe. Inflow rates are mapped for the respective components of the input recipe to find settings that provide both high nitride etch rates and high selectivity towards the SiN material. A pins-up scheme is used for simultaneously stripping away backside nitride with topside nitride.

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[51] Int. Cl.<sup>6</sup> ..... B44C 1/22; H01L 21/302

[52] U.S. Cl. .... 438/724; 438/719; 438/723; 438/740

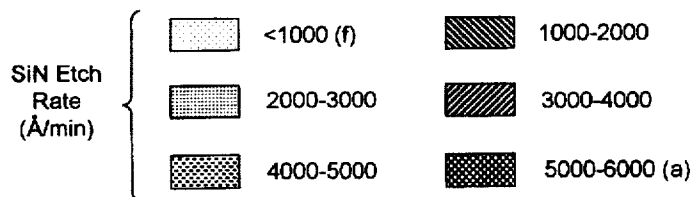
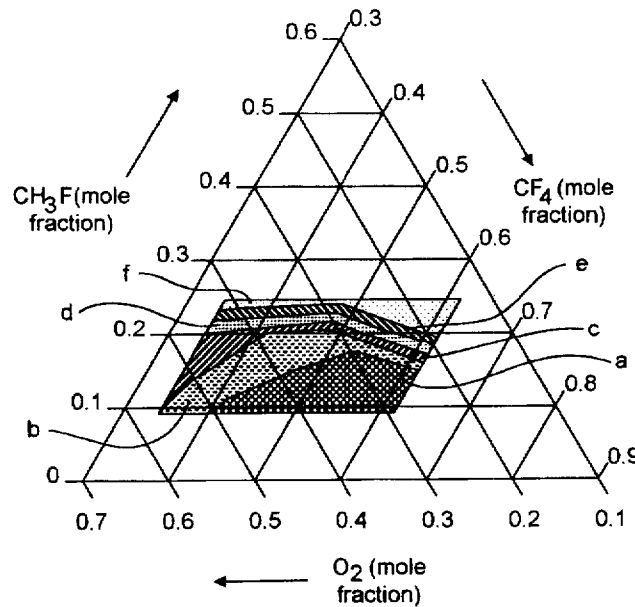
[58] Field of Search ..... 438/724, 719, 438/723, 740

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18 Claims, 6 Drawing Sheets



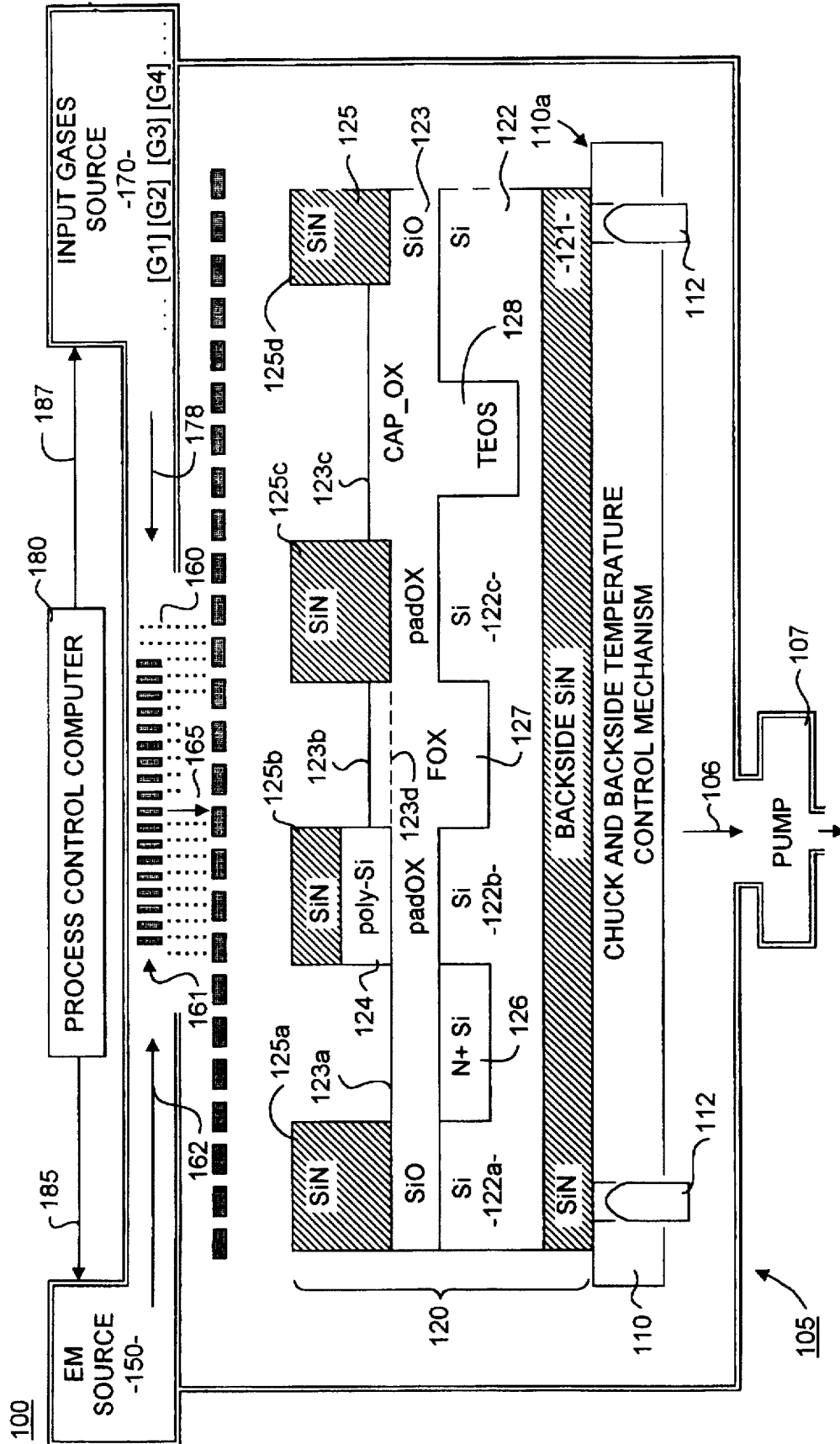


FIG. 1

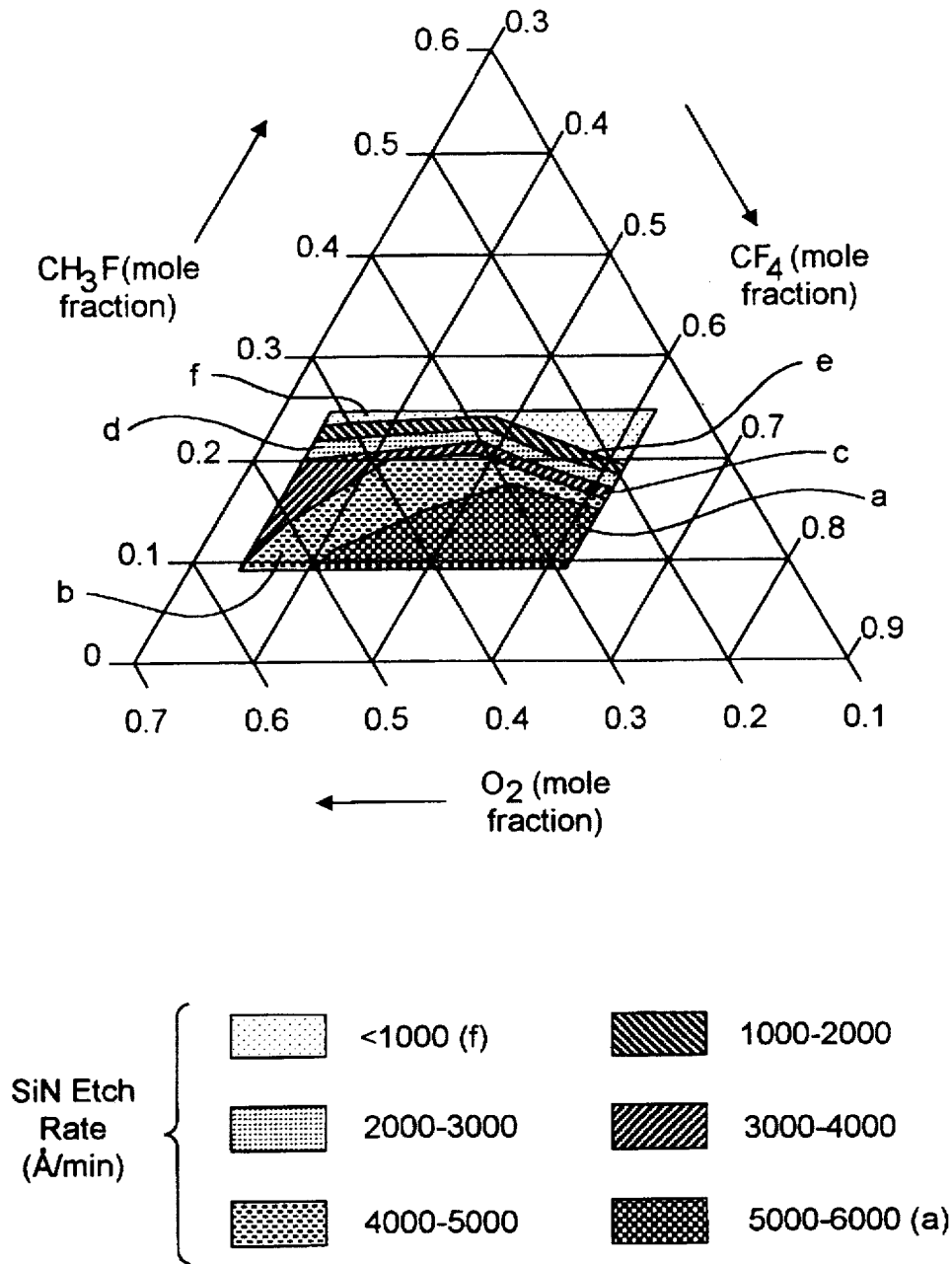


FIG. 2

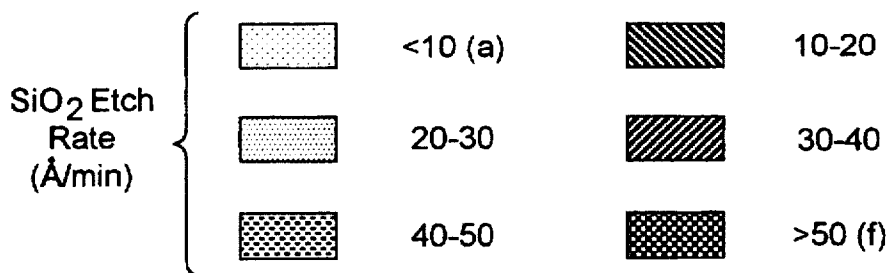
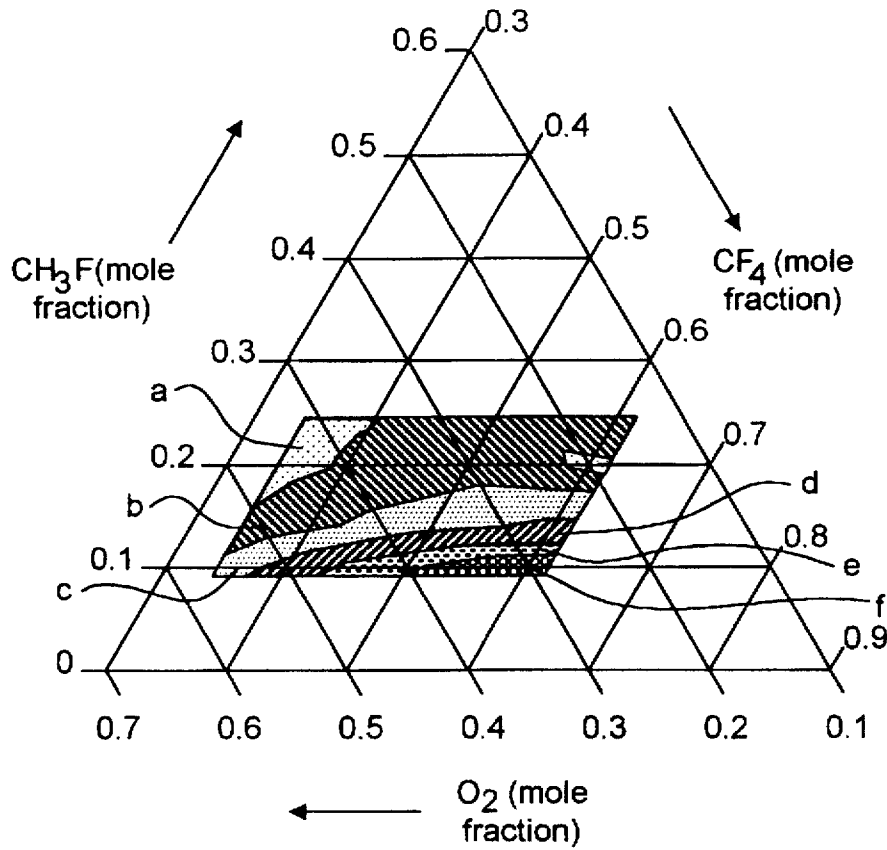


FIG. 3

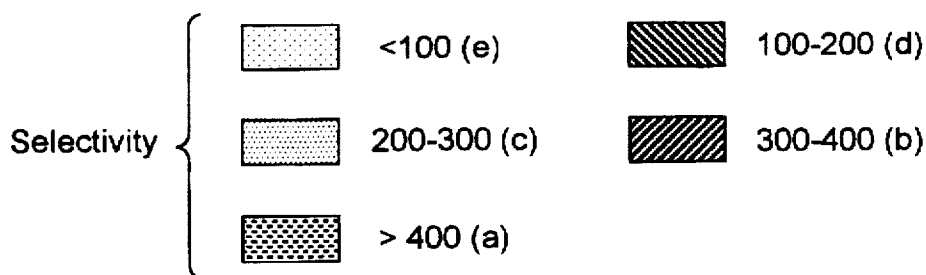
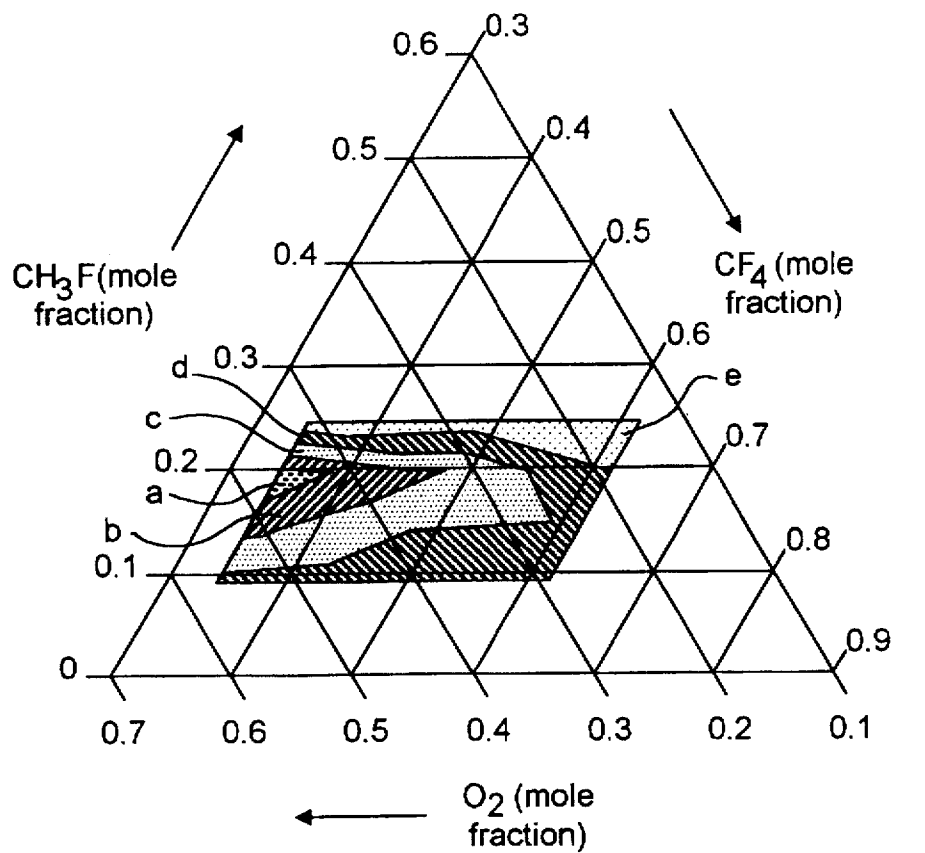


FIG. 4

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