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(54) Title: HARDMASK OPEN AND ETCH PROFILE CONTROL WITH HARDMASK OPEN

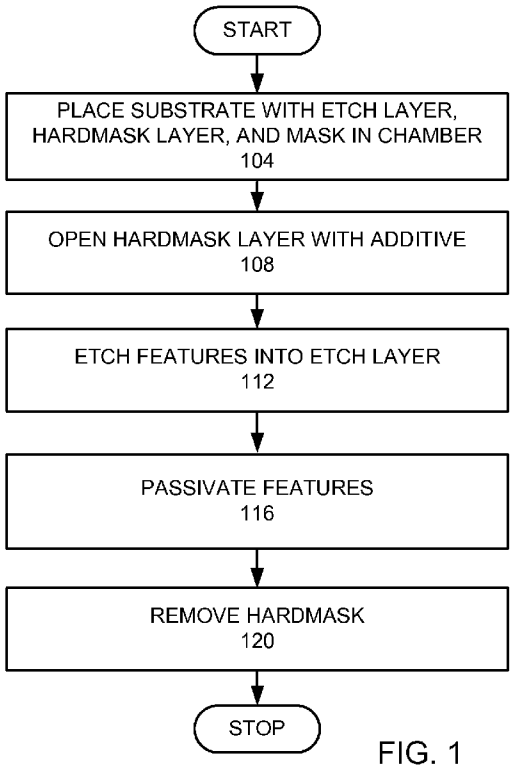


FIG. 1

(57) Abstract: A method for opening a carbon-based hardmask layer formed on an etch layer over a substrate is provided. The hardmask layer is disposed below a patterned mask. The substrate is placed in a plasma processing chamber. The hardmask layer is opened by flowing a hardmask opening gas including a COS component into the plasma chamber, forming a plasma from the hardmask opening gas, and stopping the flow of the hardmask opening gas. The hardmask layer may be made of amorphous carbon, or made of spun-on carbon, and the hardmask opening gas may further include O_2.

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