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(54) Title: IODINE-CONTAINING FLUOROCARBON AND HYDROFLUOROCARBON COMPOUNDS FOR ETCHING SEMI-CONDUCTOR STRUCTURES

(57) Abstract: Disclosed are methods for etching a silicon-containing film to form a patterned structure, methods for reinforcing and/or strengthening and/or minimizing damage of a patterned mask layer while forming a patterned structure and methods for increasing etch resistance of a patterned mask layer in a process of forming a patterned structure. The methods include using an activated iodine-containing etching compound having the formula $C_nH_xF_yI_z$, wherein $4 \leq n \leq 10$, $0 \leq x \leq 21$, $0 \leq y \leq 21$, and $1 \leq z \leq 4$ as an etching gas. The activated iodine-containing etching compound produces iodine ions, which are implanted into the patterned hardmask layer, thereby strengthening the patterned mask layer.

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