

CLAIMS

[Claim 1]

An etching method of etching a film structure, in which an end portion of a film layer in which a silicon oxide film and a silicon nitride film formed in advance on a wafer disposed in a processing chamber are alternately stacked in a vertical direction forms a side wall of a groove or a hole, by supplying processing gas into the processing chamber, the etching method comprising:

a step of supplying hydrogen fluoride and alcohol vapor into the processing chamber, maintaining the wafer at a temperature of -20°C or lower, preferably -20°C to -60°C , and etching the silicon oxide film from the end portion in a lateral direction.

[Claim 2]

The etching method according to claim 1, further comprising:

a step of heating the wafer in vacuum after a step of etching the silicon oxide film by supplying the vapor.

[Claim 3]

The etching method according to claim 1, wherein the etching is performed by maintaining the temperature of the wafer in a range of -30°C to -50°C .

[Claim 4]

The etching method according to claim 1, wherein a plurality of steps including the step of etching the silicon oxide film by supplying the hydrogen fluoride and the alcohol vapor and the step of heating the wafer are regarded as one cycle, and the cycle is repeated a plurality of times to etch the silicon oxide film.

[Claim 5]

The etching method according to claim 1, wherein the alcohol is methanol.

[Claim 6]

The etching method according to claim 1, wherein inert gas is supplied into the processing chamber together with the hydrogen fluoride and the alcohol vapor.

[Claim 7]

The etching method according to claim 2, wherein in the step of heating the wafer, the wafer is heated by emitting light from a lamp.

[Claim 8]

The etching method according to claim 2, wherein the etching is performed by maintaining the temperature of the wafer in a range of -30°C to -50°C .

[Claim 9]

The etching method according to claim 2, wherein a plurality of steps including the step of etching the silicon oxide film by supplying the hydrogen fluoride and the alcohol vapor and the step of heating the wafer are regarded as one cycle, and the cycle is repeated a plurality of times to etch the silicon oxide film.

[Claim 10]

The etching method according to claim 2, wherein the alcohol is methanol.

[Claim 11]

The etching method according to claim 2, wherein inert gas is supplied into the processing chamber together with the hydrogen fluoride and the alcohol vapor.