

According to a first aspect of the present invention, there is provided an etching method for plasma-etching a silicon substrate containing silicon or in addition having a silicon oxide film using a halogen fluoride having a nitrogen (N_2) content of 1vol% or less as an etching gas.

In an embodiment, a halogen fluoride is at least one selected from ClF_3 , BrF_5 , IF_3 , IF_7 , ClF , BrF_3 , IF_5 and BrF .

In an embodiment, an etching gas further contains 90vol% or less of a diluent gas selected from Ar, Ne, Kr and Xe.

In an embodiment, the above etching method comprises the steps of: providing a mask in a silicon substrate containing silicon or in addition having a silicon oxide film, transporting the substrate into a processing chamber and mounting the substrate on a mount table inside the processing chamber; decompressing the inside of the processing chamber; supplying the etching gas into the processing chamber; and forming plasma inside the processing chamber to perform anisotropic etching based on an electric potential difference between the plasma and the mounted substrate.

According to a second aspect of the present invention, there is provided a method for producing a semiconductor using the above etching method.

Advantageous Effects of Invention

[0011]

According to embodiments of the present invention, the

N₂ content in the etching gas composed of halogen fluoride is adjusted to be equal to or lower than a predetermined amount and therefore it is possible to provide a method for precisely etching silicon or a silicon oxide film.

Brief Description of Drawings

[0012]

[Fig. 1] is a schematic drawing showing an etching device used in the present invention.

Description of Embodiments

[0013]

Hereinafter, the embodiments of the present invention are described below.

In the etching method according to the present invention, silicon or a silicon oxide film on a substrate surface is etched by using a halogen fluoride.

[0014]

Substrate

Substrates are not particularly limited as far as they can be processed by plasma etching and include, for example, glass substrates, silicon substrates and GaAs substrates.

Among these substrates, silicon substrates are suitable in the present invention when using the silicon substrates