as it approaches the surface of the Si layer and is formed in a part constituting the surface of the Si layer, the number of COPs in a thickness direction of the Si layer being a minimum value at the surface of the Si layer.

[0013]

According to another aspect of the present disclosure, a pellicle comprises: a Si substrate with a ring-like planar shape, a Si oxide film which has a ring-like planar shape, formed on a surface of the Si substrate, a Si layer which has a ring-like planar shape, formed on a surface of the Si oxide film, and a SiC film formed on a surface of the Si layer, wherein the Si layer includes a low COP (Crystal Originated Particle) portion which is a part where the number of COPs decreases as it approaches the surface of the Si layer and is formed in a part constituting the surface of the Si layer, the number of COPs in a thickness direction of the Si layer being a minimum value at the surface of the Si layer.

[0014]

According to another aspect of the present disclosure, a method for manufacturing a pellicle intermediary body comprises steps of: preparing a Si layer which includes a low COP (Crystal Originated Particle) portion which is a part where the number of COPs decreases as it approaches a surface and is formed in a part constituting the surface, preparing a first oxide film substrate including a first Si substrate, and a first Si oxide film formed on a surface of the first Si substrate, preparing a second oxide film substrate including a second Si substrate, a second Si oxide film formed on a surface of the second Si substrate, joining the first Si oxide film to the surface of the Si layer, removing a part that constitutes a reverse side of the Si layer after joining the first Si oxide film, joining the second Si oxide film to the reverse side of the Si layer after the part constituting the reverse side of the Si layer is removed, exposing the first Si oxide film by wet etching the first Si substrate under a condition that an etching rate of Si is faster than an etching rate of Si oxide after joining the second Si oxide film, and exposing the surface of the Si layer by removing the first Si oxide film after exposing the first Si oxide film.

[0015]

Preferably, according to the method for manufacturing, the first oxide film substrate containing the first Si substrate and the first Si oxide film formed on the surface and the reverse side of the first Si substrate is prepared, in the step in which the first oxide film substrate is prepared, and the method further comprises a step of exposing the reverse side of the first Si substrate by removing a portion formed on the reverse side of the first Si substrate in the first Si oxide film, after joining the first Si oxide film.

[0016]

Preferably, according to the method for manufacturing, the second oxide film substrate containing the second Si substrate and the second Si oxide film formed on the surface and the reverse side of the second Si substrate is prepared, in the step in which the second oxide film substrate is prepared, and the method further comprises a step of exposing the reverse side of the second Si substrate by removing a portion formed on the reverse side of the second Si substrate in the second Si oxide film, after joining the second Si oxide film.

[0017]

According to another aspect of the present disclosure, a method for manufacturing a pellicle comprises steps of: producing a pellicle intermediary body using the above method, forming a SiC film on a surface of the Si layer, forming a recessed part on the second Si substrate and exposing the second Si oxide film on a bottom of the recessed part, by wet etching the second Si substrate under a condition that an etching rate of Si is faster than an etching rate of Si oxide, and exposing the SiC film on the bottom of the recessed part by wet etching the second Si oxide film and the Si layer that are present at the bottom of the recessed part.

WHAT IS CLAIMED IS:

1. A pellicle intermediary body comprising:

a Si substrate,

a Si oxide film formed on a surface of the Si substrate, and

a Si layer formed on a surface of the Si oxide film, wherein

the Si layer includes a low COP (Crystal Originated Particle) portion which is a part where the number of COPs decreases as it approaches the surface of the Si layer and is formed in a part constituting the surface of the Si layer, the number of COPs in a thickness direction of the Si layer being a minimum value at the surface of the Si layer.

2. A pellicle comprising:

a Si substrate with a ring-like planar shape,

a Si oxide film which has a ring-like planar shape, formed on a surface of the Si substrate,

a Si layer which has a ring-like planar shape, formed on a surface of the Si oxide film, and

a SiC film formed on a surface of the Si layer, wherein

the Si layer includes a low COP (Crystal Originated Particle) portion which is a part where the number of COPs decreases as it approaches the surface of the Si layer and is formed in a part constituting the surface of the Si layer, the number of COPs in a thickness direction of the Si layer being a minimum value at the surface of the Si layer.

3. A method for manufacturing a pellicle intermediary body comprising steps of:

preparing a Si layer which includes a low COP (Crystal Originated Particle) portion which is a part where the number of COPs decreases as it approaches a surface and is formed in a part constituting the surface,

preparing a first oxide film substrate including a first Si substrate, and a first Si oxide film formed on a surface of the first Si substrate,

preparing a second oxide film substrate including a second Si substrate, a second Si oxide film formed on a surface of the second Si substrate,

joining the first Si oxide film to the surface of the Si layer,

removing a part that constitutes a reverse side of the Si layer after joining the first Si oxide film,

joining the second Si oxide film to the reverse side of the Si layer after the part constituting the reverse side of the Si layer is removed,

exposing the first Si oxide film by wet etching the first Si substrate under a condition that an etching rate of Si is faster than an etching rate of Si oxide after joining the second Si oxide film, and

exposing the surface of the Si layer by removing the first Si oxide film after exposing the first Si oxide film.

4. The method for manufacturing a pellicle intermediary body according to claim 3, wherein

the first oxide film substrate containing the first Si substrate and the first Si oxide film formed on the surface and the reverse side of the first Si substrate is prepared, in the step in which the first oxide film substrate is prepared, and the method further comprises a step of

exposing the reverse side of the first Si substrate by removing a portion formed on the reverse side of the

first Si substrate in the first Si oxide film, after joining the first Si oxide film.

5. The method for manufacturing a pellicle intermediary body according to claim 3, wherein

the second oxide film substrate containing the second Si substrate and the second Si oxide film formed on the surface and the reverse side of the second Si substrate is prepared, in the step in which the second oxide film substrate is prepared, and the method further comprises a step of

exposing the reverse side of the second Si substrate by removing a portion formed on the reverse side of the second Si substrate in the second Si oxide film, after joining the second Si oxide film.

6. A method for manufacturing a pellicle comprising steps of:

producing a pellicle intermediary body using the method according to claim 3,

forming a SiC film on a surface of the Si layer,

forming a recessed part on the second Si substrate and exposing the second Si oxide film on a bottom of the recessed part, by wet etching the second Si substrate under a condition that an etching rate of Si is faster than an etching rate of Si oxide, and

exposing the SiC film on the bottom of the recessed part by wet etching the second Si oxide film and the Si layer that are present at the bottom of the recessed part.

7. The method for manufacturing a pellicle according to claim 6, further comprising a step of:

forming the recessed part on the second Si substrate by mechanically grinding the second Si substrate, after the step that manufactures the pellicle film intermediary body and before the step that exposes the second Si oxide film, wherein

the second Si oxide film is exposed at the bottom of the recessed part by wet etching the second Si substrate existing at the bottom of the recessed part at the step that exposes the second Si oxide film.

8. The method for manufacturing a pellicle according to claim 6, wherein

the step that exposes the SiC film at the bottom of the recessed part includes

a step that exposes the Si layer at the bottom of the recessed part by wet etching the second Si oxide film existing at the bottom of the recessed part, and

a step that exposes the SiC film at the bottom of the recessed part by wet etching the Si layer existing at the bottom of the recessed part, wherein

the Si layer is moved relative to liquid chemical used for wet etching of the Si layer at the step that exposes the SiC film.